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December 20, 2004

Via Messenger

Larry L. Johnson, Esq.
Senior Attorney
U.S. Environmental Protection Agency
77 W. Jackson Blvd., CS-3T
Chicago, Illinois 60604

Re: PRP Petition

Dear Mr. Johnson:

Enclosed is the PRP Petition we filed way back in 1994. EPA never responded to this petition.

Please call with any questions. Separately, we will be submitting a position paper regarding past costs the first week of the new year.

Very truly yours,

Reed S. Oslan, P.C.

RSO/nmb

Enclosures

cc: W.C. Blanton
Jerry Maynard

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Reed S. Oslan
To Call Writer Direct
312 861-2240

March 2, 1994

Larry L. Johnson, Esq.
Senior Attorney
U.S. Environmental Protection Agency
77 W. Jackson Blvd., CS-3T
Chicago, Illinois 60604

Re: Miles Inc.'s Petition To Identify Additional PRPs
Himco Superfund Site, Elkhart, Indiana

Dear Mr. Johnson:

As we discussed last week, Miles Inc. disagrees with the remedial decision U.S. EPA has made regarding the Himco Site and continues to believe that no present or future risk exists there. However, if U.S. EPA feels compelled to continue with its selected remedy at the Site and pursue Potentially Responsible Parties ("PRPs"), Miles believes the current PRP list is incomplete. Miles has conducted an investigation to identify additional PRPs, the results of which are enclosed.

In connection with its investigation, Miles has reviewed U.S. EPA's §104(e) information requests, company responses, and customer ledgers of the former landfill operator, Himco Waste Away Service, Inc. ("Himco"). In addition, Miles has taken the sworn statement of a knowledgeable past landfill operator, former Himco employee, Jerry D. Perrin. Based on this investigation, Miles has uncovered substantial evidence of companies that arranged for disposal of CERCLA hazardous substances at the Himco Site. Without waiving any of its objections to U.S. EPA's decision to take action at the Site, we are writing now to urge U.S. EPA to name these companies as additional PRPs at Himco. Again, we do not believe CERCLA action is appropriate at HIMCO, but if U.S. EPA decides to proceed, all PRPs should be included.

B 224358

I. BACKGROUND

To date, U.S. EPA has identified only 43 PRPs out of almost 600 Himco customers and local businesses identified in U.S. EPA files. See PRP List, attached as Exhibit A. There are

two apparent reasons for the low percentage of named PRPs. First, U.S. EPA did not send §104(e) requests to some 375 Himco customers and local businesses identified in EPA files. Second, out of the approximately 200 §104(e) requests sent, forty companies never responded.

On May 12, 1989, Miles sent U.S. EPA a detailed analysis of the §104(e) responses received by U.S. EPA. Miles identified dozens of companies that either failed to respond or improperly responded and urged U.S. EPA to add PRPs. Based on this effort, U.S. EPA named one additional PRP, the Crosbie Foundry Company.

Since that time, Miles has invested substantial time and effort to uncover additional evidence indicating that many additional PRPs should be identified. On September 16, 1992, Miles took the sworn statement of Mr. Jerry D. Perrin, a former Himco employee at the County Road 10 landfill. On October 15, 1992, Miles continued and completed Mr. Perrin's sworn statement. Based on his firsthand knowledge, Mr. Perrin specifically identified an additional 129 companies which arranged for the disposal of wastes containing hazardous substances at the landfill.

II. CERCLA AND EPA REGULATIONS REQUIRE ADDITIONAL PRPs BE NAMED

According to §107 of CERCLA, PRPs under the statute include:

> "(3) any person who by contract, agreement, or otherwise arranged for disposal or treatment, or arranged with a transporter for transport for disposal or treatment, of hazardous substances owned or possessed by such person . . . at any facility
>
> * * *
>
> from which there is a release, or a threatened release which causes the incurrance of response costs, of a hazardous substance, shall be liable . . . ."

See CERCLA §107(a)(3) and (4) (1993).

Under §113 of CERCLA, U.S. EPA is required to investigate, determine the identity of, and notify PRPs at Superfund sites:

> **"Potentially Responsible Parties.** -- The President [through the EPA] shall make reasonable efforts to identify and notify potentially responsible parties . . . ."

See CERCLA §113(k)(2)(D) (1993).

U.S. EPA regulations also define the agency's duty to investigate and identify PRPs:

> "The [Regional Project Manager] shall, to the extent practicable, collect pertinent facts about the discharge or release, such as its source and cause [and] the identification of potentially responsible parties . . . ."

See 40 C.F.R. §300.135(c) (1992).

In addition, EPA's own policy statements mandate agency personnel to conduct thorough investigations to ensure that those entities which in fact are PRPs are named as PRPs at a site. As EPA has stated:

> "It is the responsibility of the Office of Solid Waste and Emergency Response through its Regional program personnel, with the assistance of Agency legal personnel, the Department of Justice, and State legal personnel where appropriate, to undertake the necessary investigations to determine the existence of potentially responsible parties [PRPs] for releases or threatened releases where EPA is the lead Agency under the proposed revisions to the NCP."

See U.S. EPA Policy Statement, 47 Fed. Reg. 20664-01 (May 1982) (emphasis added).

The purpose of naming PRPs at sites is to ensure that those parties which may be liable for EPA response are involved and share in the response process. Thus, a thorough PRP investigation is critical to implementing the goals of CERCLA.

III. NEW EVIDENCE INDICATES ADDITIONAL COMPANIES SHOULD BE NAMED PRPs AT HIMCO

A. EPA's Initial Investigation Was Incomplete

EPA's initial investigation to identify PRPs was through §104(e) requests to Himco customers and local businesses. This investigation was never fully completed. First, EPA failed to ask several hundred Himco customers and local businesses to submit information documenting whether they sent hazardous substances to the landfill. Indeed, in April 1991, EPA's own consultant, Life Systems, Inc., recommended that EPA contact companies which previously were not sent information requests:

> "It is also recommended the [potential] PRP list be reviewed again, in light of recent sampling results, to determine if any of these [potential] PRPs should now be contacted."

See, Life Systems, Inc. PRP Final Report ¶ 4.3 (April 1991). EPA's consultant also recommended that those companies which were sent requests, but which failed to respond, should be contacted again:

> "A second attempt to obtain information from these [non-responding] PRPs is recommended."

See, Life Systems Final PRP Report, §4.2 (April 1991). Based on available information, Miles understands that U.S. EPA did not contact the additional companies and has not reinitiated contacts with non-responding companies. This forced Miles to develop the factual record on its own.

B. Statement Of Mr. Jerry D. Perrin

On September 16 and October 15, 1992, Miles took the sworn statement of former Himco employee, Mr. Jerry D. Perrin. See Perrin Statement, Vol. III, enclosed with this letter (Miles previously forwarded to EPA Vols. I and II). Mr. Perrin worked at the County Road 10 landfill from 1970 until its closure in approximately October 1976.

Mr. Perrin's experience with the landfill operation is extensive. He worked there seven days per week, fifty hours each week. See Statement at 16 and 328-29. In his statement, Mr.

Perrin describes how during that time he drove customer truck routes collecting filled waste containers. Id. at 321. As Mr. Perrin collected containers, he often came in contact with and observed customer wastes, either through inspecting container contents or picking up stray wastes fallen from containers. Id. at 322-23. Further, based on his observations, he became familiar with the specific operations of Himco customers and what wastes each customer generated and disposed. Id. at 8-9. Finally, he always observed wastes as they were dumped from the customer's container. Id. at 324.

Mr. Perrin also personally directed and conducted the landfilling operations. He worked as a landfilling bulldozer operator and directed operations throughout his employment. Id. at 324-25. While landfilling on the bulldozer, Mr. Perrin personally observed wastes from a particular customer immediately after they had been dumped at the landfill. Id. at 325-27. Often, he observed company names or logos on waste items or containers. Id. at 327. He also knew, based on conversations with drivers and his familiarity with each customer's containers, which containers came from a particular customer and what wastes they contained. Id. at 16-17 and 326, 328. Thus, based on his years of experience and first-hand observations, Mr. Perrin has extensive knowledge regarding the wastes each Himco customer disposed at the landfill. Id. at 24.

Mr. Perrin identified several customers which disposed various commercial and industrial wastes. He reviewed a list of 313 companies compiled from Himco customer lists and U.S. EPA information on local Elkhart businesses. See Exhibit 1 to Statement. At the continuation of the sworn statement, Mr. Perrin reviewed a list of 83 additional companies compiled from Himco customer ledgers dating from 1970 through 1976. See Exhibit 2 to Statement and Statement at 20-21. Based on his knowledge, Mr. Perrin specifically identified a total of 129 companies which were Himco customers and which had disposed various commercial and industrial wastes at the landfill. This list of Identified Companies is attached hereto as Exhibit B. The identified Companies include mobile home manufacturers, foundries, metal fabricators, plastics manufacturers, and automobile servicing stations.

Mr. Perrin also specifically described the wastes sent by each identified company. These wastes include items such as paints, glues, solvents, scrap metals, foundry sands, used

batteries, oily auto parts, degreasers and oily rags. See Exhibit B and Perrin Statement, Vols. I, II, and III.

C. The Wastes Identified Contain Hazardous Substances

According to U.S. EPA's own technical publications, the wastes disposed by the identified Himco customers contain CERCLA hazardous substances. For example, oils, solvents, degreasers, batteries, and paints each contain hazardous substances as defined by CERCLA. U.S. EPA's findings are summarized in the tables attached as Exhibit C. The complete EPA technical documents are attached hereto as Exhibit D. See, Does Your Business Produce Hazardous Waste?, 530-SW-90-027 (January, 1990).

Each identified company in Exhibit B sent wastes containing CERCLA hazardous substances to the landfill. According to CERCLA and EPA regulations, these companies should be named PRPs.

IV. CONCLUSION

Based on the additional evidence identifying 129 additional companies which have arranged for the disposal of wastes containing hazardous substances at the landfill, Miles urges U.S. EPA to name these additional PRPs.

If you have any questions, please call me.

Sincerely,

Reed S. Oslan, Esq.

RSO:bas
Enclosures

cc: Mary Elaine Gustafson (w/encls.)
Spencer J. Nunley, Esq. (w/encls.)
Gerard F. Hickel, Esq. (w/encls.)
Diane K. Moore, Esq. (w/encls.)

POTENTIALLY RESPONSIBLE PARTIES
IDENTIFIED TO DATE BY U.S. EPA

Party

1. **AACOA COMPANY**
2551 County Road 10
Elkhart, Indiana 46514
(219) 262-4685

2. **Adams & Westlake Co.**
940 North Michigan Street
Elkhart, Indiana 46516
(219) 264-1141

3. **Armstrong WT Company**
1000 Industrial Parkway
Elkhart, Indiana 46516
(219) 295-0079

4. **Arrow Tool, Inc.**
3000 Hammond Avenue
Elkhart, Indiana 46516

5. **Bower Manufacturing**
2515 Industrial Park Drive
Elkhart, Indiana 46516
(219) 533-0525

6. **CLD Corporation**
c/o Antoinette Beuche
Howard & Howard
1400 N. Woodward, Suite 250
Bloomfield Hills, Michigan 48304
(810) 645-1483

7. **CTS Corporation**
900 North West Boulevard
Elkhart, Indiana 46516
(219) 293-7511

8. **Cauffman Products, Inc.**
26683 Windsor Avenue
P. O. Box 1388
Elkhart, Indiana 46516

9. **Conrail Corporation**
16A Two Commerce Square
2001 Market Street
Philadelphia, Pennsylvania 19103
(215) 209-2000
Philadelphia, Pennsylvania 19103

Party

10. **Craft, Jr., Alonzo**
c/o Michael A. Consentino
Cosentino, Walker Shewmaker & Christofeno
115 West Lexington Avenue
Elkhart, Indiana 45615
(219) 295-6210

11. **Crosbie Foundry, Inc.**
1600 Mishawaka Street
Elkhart, Indiana 46514-1898
(219) 262-1502

12. **Domore Systems Division**
28652 Phillips
Elkhart, Indiana 46514
(219) 262-3506

13. **Durakool, Inc.**
P. O. Box 280
Elkhart, Indiana 46515
(219) 264-1116

14. **ESI Meats**
605 Kesco Drive
Bristol, Indiana 46507

15. **Eaz-Lift Spring Corp.**
1318 West Bristol Street
Elkhart, Indiana 46514
(219) 264-3158

16. **Elkhart General Hospital**
600 East Boulevard
Elkhart, Indiana 46514
(219) 294-2621

17. **Excel Industries, Inc.**
c/o W.C. Blanton
Ice Miller Donadio & Ryan
One American Square
Indianapolis, Indiana 46282
(317) 236-2100

18. **Foamex Products, Inc.**
603 Industrial Parkway
Elkhart, Indiana 46514
(219) 294-5663

Party

19. **Gaska Tape, Inc.**
1810 W. Lusher Avenue
Elkhart, Indiana 46517
(219) 294-5431

20. **Glascoat of Midwest**
720 Collins Avenue
Elkhart, Indiana 46514

21. **Hartson-Kennedy Co., Inc.**
28322 County Road 20
Elkhart, Indiana 46514
(219) 293-2504

22. **Henkels & McCoy, Inc.**
1800 Johnson Street
Elkhart, Indiana 46514
(219) 264-1121

23. **Hermaseal Company, Inc.**
P.O. Box 280
Elkhart, Indiana 46515
(219) 264-1116

24. **Himco Waste-Away Services, Inc.**
c/o Richard W. Paulen
Barnes & Thornburg
301 South Main Street
Elkhart, Indiana 46516
(219) 293-0681

25. **Himes, Jr., Charles**
c/o Richard W. Paulen
Barnes & Thornburg
301 South Main Street
Elkhart, Indiana 46516
(219) 293-0681

26. **Himes, Grace**
c/o Richard W. Paulen
Barnes & Thornburg
301 South Main Street
Elkhart, Indiana 46516
(219) 293-0681

Party

27. **Indiana Michigan Power Company**
P.O. Box 60
Fort Wayne, Indiana 46801
(219) 422-3456

28. **Jason Industries**
1500 W. Lusher Avenue
Elkhart, Indiana 46515
(219) 294-7595

29. **Kampco Steel Products**
57533 County Road 3
Elkhart, Indiana 46517
(219) 294-5466

30. **L & J Press Corporation**
P.O. Box 339
Elkhart, Indiana 46515

31. **LaBour Pump Company**
1607 Sterling Avenue
Elkhart, Indiana 46516
(219) 293-0653

32. **Lithotone, Inc.**
1313 West Hively
Elkhart, Indiana 46517
(219) 294-5521

33. **Miles Laboratories, Inc.**
Attn: Gerald F. Hickel
Mobay Road
Pittsburgh, Pennsylvania 15205

34. **Parr, Inc.**
c/o Koopers Company
Koopers Building
Pittsburg, Pennsylvania 15219
(412) 227-2000

35. **Rapture Studio**
300 Oakwood
Elkhart, Indiana 46514
(219) 262-1324

36. **Riblet-Frame**
P.O. Box 1124
Elkhart, Indiana 46515

Party

37. **Selmer Division**
600 Industrial Parkway
Elkhart, Indiana 46516
(219) 522-1675

38. **Triangle Products**
2111 Industrial Parkway
Elkhart, Indiana 46515

39. **Truth Publishing**
421 South Second Street
Elkhart, Indiana 46516
(219) 294-1661

40. **Universal Forest Products #1**
50415 Herbert
Granger, Indiana 46530
(219(277-7670

41. **Valley Machine Products, Inc.**
1840 Borneman Avenue
Elkhart, Indiana 46517
(219) 294-2617

42. **Walerko Tool & Engineering**
1935 West Lusher Street
Elkhart, Indiana 46517
(219) 295-2233

43. **White Hall Laboratories**
1919 Superior Street
Elkhart, Indiana 46514

IDENTIFIED COMPANIES

No.	Customer Name*	Business	Waste
1	Abshire c/o Abshire Bridger 17616 Co. Rd. 40 Goshen, IN	Car wash.	Paper; soaps; cleaners (Tr. 331-333).
2	Accra Pac, Inc. 2040 Toledo Road	Aerosol cans mfg.	Cans; solvents; degreasers; cardboard; skids (Tr. 310-311).
3	Ace Cab of Elkhart, Inc. 300 E. High St.	Auto maint.	Oil filters; air cleaners; batteries; tires; automobile fluids; brake fluids (Tr. 27-29).
4	Air Equipment Sales & Service 500 Baldwin	Air compressor sales.	Air hoses; office paper; wood (Tr. 32-33).
5	All-Phase Electric Supply Co. 1839 Middlebury	Electric contractor.	Electric cords; scrap wiring; oily rags; cardboard; wood; motor parts (Tr. 33-35).
6	Alum-A-Form	Mobile home mfg.	Scrap aluminum; steel bands; skids; cardboard (Tr. 35-36).
7	Amax Aluminum/Mill Products c/o Alumax Building Products 206 Kesco Dr. Bristol, IN	Metal finishing.	Scrap metal; oily rags; paper; skids (Tr. 36-37).
8	American Formed Plastics 700 West Beardsley	Plastics.	Plastic; pigments; skids; cardboard; paper; glues; solvents (Tr. 37-39).
9	American Home Improvements 1705 S. Main St.	Construction.	Wood; aluminum or metal siding; shingles; scrap metal; tar buckets (Tr. 40-42).
10	American Plastics of Elkhart Inc. Plant #2 US Hwy. 20 W.	Plastics.	Plastic; glues; solvents; pigments; paints; cardboard; skids; paper (Tr. 42-44).
11	Anco Products, Inc. 2500 S. 17th St.	Insulating products.	Cardboard; fiberglass insulation; steel wire; skids (Tr. 44-45).
12	Atlantic Richfield Co. North Indiana Toll Road South Indiana Toll Road	Auto maint.	Automobile fluids; tires; batteries; solvents; degreasers; oily rags; paper (Tr. 50-53).

No.	Customer Name*	Business	Waste
13	Atlas Die Inc. 2000 Middlebury St.	Foundry and die pattern shop.	Foundry sand; wood; metal shavings; paper (Tr. 53-54).
14	Babcock & Wilcox Co. Tubular Product Division 1019 Mishawaka St.	Foundry.	Foundry sand; steel tubing; scrap metal; wood; cutting oil residue; solvents; degreasers (Tr. 55-57).
15	Barger Packaging Corp. 1511 W. Lusher	Packaging mfg.	Cardboard; skids; banding; ink (Tr. 61-62).
16	Battjes Pontiac, Inc. 2016 W. Franklin St.	Auto maint.	Oil; batteries; tires; oily rags; auto fluid residue; solvent residue; degreasing residue (Tr. 62-64).
17	Battler Manufacturing c/o Battler Industries Corp. 56741 Elk Park Dr.	Foam cushion mfg.	Glues; foam; scrap vinyl (Tr. 64-66).
18	Bethel Publishing 1819 S. Main	Publishing.	Inks; skids; cardboard; paper (Tr. 66-67).
19	Bi-Lo Station #1021 P.O. Box 6666 Ashland, KY 41101	Auto fuel.	Oil cans; paper (Tr. 67-68).
20	Bill Elsey Olds Cadillac 711 N. Nappanee St.	Auto maint.	Tires; car parts; oil cans; air cleaners; oily rags; bumpers; fenders; paint cans; batteries; degreasers; engine fluids; brake fluids; transmission fluids; wood; cardboard; plastic (Tr. 150-152).
21	Broadway Elkhart 640 Collins Rd.	Aluminum extrusion.	Scrap metals; pallets; banding; solvents; industrial cleaning solutions; cutting oils (Tr. 74-76).
22	Burnstine's Distributing Corp. 358 S. Elkhart Ave.	RV distributor.	Cardboard; bandings; skids; roof-sealant cans; caulking (Tr. 76-78).
23	By-Pass Paint Shop Inc. 1132 N. Nappanee St.	Van painting.	Paint cans; masking with paint residue; paint thinner; cleaning solvents; degreasers; office waste (Tr. 78-80).

No.	Customer Name*	Business	Waste
24	By-Pass Shell 415 N. Nappanee St.	Auto maint.	Batteries; oily rags; tires; motor parts with oil and fluid residue (Tr. 80-81).
25	CG Conn Ltd. c/o United Musical Instruments USA Inc. 1000 Industrial Pkwy.	Band instrument mfg.	Soldering agents; fluxes; buffing wheels; scrap metals; lacquers; solvents; paint thinner; cutting oil; skids; cardboard; banding; office waste (Tr. 81-84).
26	Champion Motor Homes (formerly Titan Homes) 58277 State Rd. 19	Mobile home mfg.	Scrap metals; glues; paints; primers; lacquers; solvents; oils; greases; roof-sealant cans; caulking; office waste (Tr. 87-89).
27	Checker Oil Co. 23221 U.S. Hwy. 33	Auto fuel; auto maint.	Tires; batteries; oil cans; brake fluid cans (Tr. 89-90).
28	City Roofing 2246 Sterling Ave.	Roof contractor.	Shingles; tar; sealants; wood; weatherstripping metal; gutters (Tr. 90-92).
29	Clark Oil Refining 200 W. Bristol	Auto fuel.	Oil cans; transmission fluid cans; windshield washer solvent cans (Tr. 92-93).
30	Consoweld Mfg.	Formica countertops mfg.	Chipboard; plastic; formica countertops; empty glue buckets (Tr. 340-341).
31	Continental Can Division St.	Container mfg.	Cardboard; banding; skids; oily rags; grease; cans with oil and grease residue (Tr. 95-96).
32	Custom Vinyl-Patrick Industries 2150 W. Lusher Ave.	Vinyl laminators.	Glues; vinyl; cardboard; banding; skids (Tr. 100-101).
33	Delta Formed Plastic c/o LRV-EASCO 53028 Ada Dr.	Plastics.	Plastics; glues; solvents; solvent cans; paints; pigments; machine oil; cardboard; skids; banding (Tr. 103-104).

No.	Customer Name*	Business	Waste
34	Devan Corp. 207 Oakwood Ave.	Van conversions.	Steel; aluminum; glues; paints; lacquers; paint thinner; industrial cleaners; degreasers; skids (Tr. 104-106).
35	Don's Printing Inc. 1621 W. Beardsley Ave.	Printing.	Cardboard; ink (Tr. 108-109).
36	Draggoo Electric Company 1631 Oakland Ave.	Electric contractor.	Electrical wire; skids; motors; oily rags; cans with oil and degreaser residue (Tr. 109-111).
37	Dygert Seating 53381 Marina Dr.	Auto and boat glass and cushion installer.	Glass; canvas; boat covers; seat cushions; glue bottles; cans with paint and sealant residue (Tr. 112-113).
38	E. K. Blessing Co., Inc. 1301 W. Beardsley Ave.	Band instrument mfg.	Soldering agents; fluxes; cleaning compounds; buffing wheels; scrap metals/scrap brass; lacquers; cutting oil; paper; thinner residue; solvent residue (Tr. 69-71).
39	Easco Aluminum 23841 Reedy Dr.	Aluminum extrusion.	Aluminum; metal shavings; cutting oils; degreasers; solvents; skids; bandings; cardboard; office waste (Tr. 117-118).
40	Eby Ford Lincoln Mercury 2714 Elkhart Rd.	Auto maint.	Bumpers; oil cans; air cleaners; oil filters; oily rags; tires; engine parts; auto fluids; batteries; skids; office waste (Tr. 120-122).
41	Eddie's Marathon Service c/o Marathan Pierre Moran 2701 Prairie St.	Auto maint.	Tires; batteries; oily rags; car parts; oil; engine fluids; office waste (Tr. 122-123).
42	Elcona Foods, Inc. 24402 Co. Rd. 45	Food packaging.	Cardboard; cellophane; skids; banding; metal wire (Tr. 123-124).

No.	Customer Name*	Business	Waste
43	Elcona Homes Corp. 2200 Middlebury St.	Mobile home mfg.	Empty glue cans; empty paint cans; scrap aluminum and steel; empty solvent cans; spray paint cans; soldering agents; caulking material; oil; copper wire with plastic insulation (Tr. 344-347).
44	Elixir Industries Inc. 640 Collins Rd.	Door mfg.	Metal clippings; aluminum; glass; glues; oily rags; solvents; degreasers; skids; banding; paints; paint thinner (Tr. 124-127).
45	Elkhart Air Service c/o Hawkeye Aviation Inc. 27658 Co. Rd. 6	Aircraft maint. (?)	Oily rags; metal; degreasers; office waste (Tr. 127-128).
46	Elkhart Bedding Co. 2124 Sterling Ave.	Bed mfg.	Metal springs; wood; fabric; office waste (Tr. 128-130).
47	Elkhart Brass Mfg. Co., Inc. 1302 W. Beardsley Ave.	Foundry.	Scrap metals; solvents; oily rags; degreasers; brass shavings; oil cans; foundry sand; banding; skids (Tr. 130-132).
48	Elkhart Bridge & Iron Co. 929 N. Michigan St.	Metal forming.	Metal shavings; floor sweepings; nuts; bolts; paints; paint thinner; cans; cutting oils; degreasers; cleaning fluids; office waste (Tr. 132-134).
49	Elkhart Foundry & Machine Co., Inc. 318 S. Elkhart Ave.	Foundry.	Foundry sand; oily rags; metal shavings; degreasers; solvents; ingots; cans containing oil residue; cardboard; skids; sand bags (Tr. 135-137).
50	Elkhart Glass Co., Inc. c/o Harmon Glass 310 E. Jackson Blvd.	Glass supplier.	Glass; mirrors; skids; banding; office waste (Tr. 139-140).
51	Elkhart Lincoln Mercury Inc. c/o Jordan Lincoln Mercury 1005 N. Nappanee St.	Auto maint.	Engine parts; batteries; tires; solvents; degreasers; oily rags; automobile parts; paints (Tr. 140-142).

No.	Customer Name*	Business	Waste
52	Elkhart Mobile Home Services 144 Witmer Ave.	Mobile home maint.	Plumbing products; copper piping; furnace parts; cardboard; metal (Tr. 143-144).
53	Elkhart Rubber Works Inc. Oakland Ave.	Rubber Manufacturing	Rubber strips; rubber black; grease; oily rags; skids; banding (Tr. 145-147).
54	Elkhart Welding & Boiler 2132 S. Main St.	Welding & painting.	Soldering agents; fluxes; fire brick; soot; oil residue; paints; degreasers; cardboard; skids; banding (Tr. 147-149).
55	Elkhart Wood Products 2300 California Rd.	Musical instrument wood mfg.	Wood; sawdust; glues (Tr. 149-150).
56	Emmert Trailer Inc. 614 Mishawaka St.	Trailer repair.	Metal pieces; hinges; welding rods; rust; paints; sealants; skids; banding; office waste (Tr. 152-154).
57	Eugene Dietzgen Co. 2500 S. 17th St.	Blue-printing.	Ink; blueprints; mylar; skids; banding; office waste (Tr. 107-108)
58	Faries-McMeekan, Inc. 28858 Co. Rd. 20	Mirror mfg.	Glass; metal framing; skids; banding; wood (Tr. 154-155).
59	Federal Press Co. 620 W. Indiana Ave.	Punch press mfg.	Scrap metals; oils; grease; oily rags; banding; skids; office waste (Tr. 349-352).
60	Fidler Inc. 1700 Egbert	Concrete mfg.	Concrete; bricks/blocks; cement bags; skids; wood; asphalt sealant; oily rags; rerod bars; office waste (Tr. 156-158).
61	Finnel System Inc. 500 East St.	Floor buffer mfg.	Paper; cardboard; skids; electrical cords; floor buffers/parts; buffing pads (Tr. 158-159).
62	Foamcraft Inc. 2506 Industrial Park Dr.	Foam products for furniture.	Foam; cardboard; skids; banding (Tr. 160-161).
63	Franklin Press, Inc. 56850-B Elk Park Dr.	Printing.	Inks; dyes; cleaning fluids; solvents (Tr. 164-165).

No.	Customer Name*	Business	Waste
64	GTE North P.O. Box 2300 Ft. Wayne, IN 46801-2300	Telephone service.	Cardboard; wire; insulators; telephones; office waste (Tr. 165-167).
65	Gano Plywood, Inc. 1334 W. Wolf Ave.	Lumber supplier.	Skids; banding; tar (Tr. 167-168).
66	GTE 129 S. Second St.	Telephone service.	Telephone wire/poles; telephones; guy wire; insulators; crossbars; office waste (Tr. 171-172).
67	Georgia-Pacific Corp. 225 Collins Rd.	Wood supplier.	Banding; plywood; chipboard; tar paper; treated lumber (Tr. 172-174).
68	Goshen Implements Inc. 64358 US Hwy. 33 Goshen, IN	Farm equip. sales/serv.	Oil filters; air cleaners; oily rags; sweeping compound; paint spray cans; solvents; engine fluids (Tr. 175-176).
69	Gunite Corporation 801 Co. Rd. 15	Wheel stamping.	Paints; rags; paper; wood; banding; solvents; degreasers (Tr. 176-179).
70	Heilman Heating & Air Conditioning, Inc. 911 Plum	Heating & air conditioning.	Heat ducts; air conditioners; furnace parts; skids; cardboard (Tr. 181-182).
71	Homan Lumber Mart, Inc. 1650 W. Lusher Ave.	Lumber supplier.	Steel banding; treated lumber; shipping paper with tar (Tr. 186-187).
72	Howmet Inc. 610 N. Wildwood Ave.	Aluminum forming.	Scrap aluminum; scrap steel; banding; skids; cardboard (Tr. 355-357).
73	Imperial Fabrics 29031 U.S. 33	Draperies.	Fabric; thread spools; office paper (Tr. 189).
74	Indiana Michigan Power 23333 U.S. 20	Electric co.	Electrical wire/poles; guy wires; oil filters; engine fluids; solvents; degreasers; glass insulators; electrical boxes; copper; electrical components (Tr. 190-193).
75	Indiana Plastics Corp. 2221 Industrial Pky.	Plastics.	Plastic; glues (Tr. 193-195).

No.	Customer Name*	Business	Waste
76	Indiana Plastics, Inc. 57500 Co. Rd. 3	Plastics.	Plastic; solvents; oil (Tr. 195-197).
77	Instamatic Corp. 2323 Middlebury St.	RV refrigerator warehouser.	Scrap refrigerators; skids; banding (Tr. 198-199).
78	Instant Copy of Indiana, Inc. 131 W. Marion St.	Printing.	Ink cans; cardboard; paper (Tr. 199-200).
79	International Foam Corp. 1500 W. Lusher St.	Foam rubber wholesaler.	Foam; cardboard; banding (Tr. 200-201).
80	J.C. Penney Company, Inc. 3701 S. Main St.	Dept. store.	Boxes; plastic; cellophane; office waste (Tr. 201).
81	Johns-Manville Corp. 2730 Industrial Pkwy.	Insulation supplier.	Insulation; banding; cardboard; skids (Tr. 202-203).
82	Journey Custom Motor Homes, Inc. 27365 Co. Rd. 6	Motor home mfg.	Steel; aluminum; glues; paints; primers; lacquers; paint thinner; solvents; soldering agents; fluxes; roof coating; skids; cardboard; banding (Tr. 203-205).
83	K-Mart Store 3501 S. Main K-Mart Store 52401 Interchange Dr.	Tire sales.	Scrap tires (Tr. 358-360).
84	Kaiser Aluminum & Chemical Corp. 2700 Industrial Pky.	Metal forming	Skids; wood; banding; aluminum; oily rags (Tr. 205-206).
85	Kelsey Axle Co. 2825 Middlebury St.	Axle manufacturing	Axles; degreasers; solvents; paints; brakes/brake parts; paint thinner; oily rags; scrap steel; banding; wooden pallets; office paper; cardboard (Tr. 208-211).
86	Kelsey-Hayes Gunite Division c/o Hayes Axle Inc. 21611 Protecta Dr.	Wheel stamping.	Axles; degreasers; paints; solvents; brakes/brake parts; paint thinner; oily rags; scrap metal; steel banding; wooden pallets; cardboard; office paper (Tr. 208-211).

No.	Customer Name*	Business	Waste
87	Kropf Manufacturing Co., Inc. 58647 St. Rd. 15	Mobile home mfg.	Steel; aluminum; glues; paints; primers; lacquers; paint thinners; solvents; soldering agents; fluxes; oil and grease residue; roof coating residue (Tr. 213-215).
88	LaSalle-Deitch Co., Inc. 640 Industrial Pky.	RV supply wholesaler.	Carpet; cardboard; skids; banding (Tr. 218-219).
89	Liberty Homes, Inc. 1101 Eisenhower Dr. Goshen, IN	Mobile home mfg.	Scrap metals; glues; paints; primers; solvents; soldering agents; fluxes; roof coating; lacquers; paint thinners; caulking; cardboard; banding; skids (Tr. 225-228).
90	Lochmandy Motor Sales, Inc. 1230 W. Bristol St.	Auto maint.	Oily rags; automobile fluids; engine fluids; brake fluids; batteries; tires; solvents; degreasers (Tr. 230-232).
91	Manville Sales Corporation c/o Manville/Schuler International Inc. 2730 Industrial Pky.	Insulation supplier.	Insulation; putty; skids; cardboard (Tr. 233-234).
92	McHenry Olds-Cadillac 1201 N. Nappanee St.	Auto maint.	Oily rags; automobile fluids; engine fluids; brake fluids; batteries; tires; solvents; degreasers; engine parts (Tr. 234-236).
93	Midwestern Rubber Products, Inc. 2124 W. Wilden Ave. Goshen, IN	Rubber mfg.	Rubber black; rubber; rubber stampings (Tr. 238-239).
94	Mittler Supply, Inc. 1820 Mishawaka St.	Welding supply.	Skids; welding wire; cardboard (Tr. 246-247).
95	Montgomery Ward 3601 S. Main	Dept. Store.	Plastic packaging; banding; skids (Tr. 361-363).
96	Mor-Ryde, Inc. 1966 Moyer Ave.	Mobile home steel fabricator.	Steel bandings; skids; wood; paint cans; paint thinner; solvents; degreasers; scrap metal (Tr. 248-249).

No.	Customer Name*	Business	Waste
97	Motor Supply Co., Inc. 134 S. Elkhart Ave.	Engine overhaul.	Oily sludge in barrels; degreasers; oily rags (Tr. 249-252).
98	NIBCO, Inc. 500 Simpson	Copper and brass fitting mfg.	Scrap brass; scrap copper; machine oil (Tr. 365-367).
99	Nagle's Office Supply	Office supply.	Scrap paper; carbon paper (Tr. 363-364).
100	Northern Box Co. Inc. 1328 Mishawaka St.	Packaging mfg.	Skids; banding; glues (Tr. 253-254).
101	Patrick Plywood c/o Patrick Industries,Inc. 1930 W. Lusher	Lumber supply.	Scrap particle board; scrap chipboard; insulation; skids; banding (Tr. 370-374).
102	Peachtree Doors Inc. Strato Fold Div. 1919 Cassopolis St.	Door mfg.	Aluminum; cardboard; glues; metal parts; paints (Tr. 258-260).
103	Pete Fall Ford, Inc. 2525 By-Pass Rd.	Auto maint.	Oily rags; oil residue; engine fluid residue; batteries; tires; solvents; degreasers; engine parts (Tr. 261-263).
104	Pierre Moran W/C c/o Pierre Moran Mall Merchants Assn. 154-40C W. Hively Ave.	Retail consumer mall.	Cardboard; plastic (Tr. 260-261).
105	Pre-Finished Molding & Door Inc. 211 Windsor Dr.	Door finishing.	Wood; banding; paint cans; lacquers; thinner; solvents; sealants; (Tr. 263-264).
106	Putnam Imports, Inc. 2200 By-Pass Rd.	Auto maint.	Oily rags, engine fluids; solvents; degreasers; engine parts; paints; batteries (Tr. 264-266).
107	Quest Products	Plastic plumbing supplier.	Scrap plastic and plastic fittings (Tr. 373-375).
108	Reese Products, Inc. 51671 St. Rd. 19	Hitch mfg.	Skids; banding; paint and thinner cans; solvents; degreasers (Tr. 266-267).
109	Robert Weed Plywood Corp. P.O. Box 487	Plywood supplier.	Plywood; chipboard; skids; banding; paper with mesh netting (Tr. 300-301).

No.	Customer Name*	Business	Waste
110	Rocket Automatic Car Wash 515 E. Lexington Ave.	Car wash.	Detergents; office paper; cardboard (Tr. 375-376).
111	Rollie Willams Paint Spot, Inc. 1179 Kent	Paint distribution.	Skids; cardboard; paint cans; thinner; degreasers; solvents (Tr. 272-273).
112	S & H Leggitt Co. 603 Industrial Pky.	Axle/wheel mfg.	Banding; paint and solvent residue; oily rags; degreasers; paint thinner (Tr. 219-222).
113	Sears Automotive Pierre Moran Mall 154-28b W. Hively	Auto maint.	Oily rags and waste; solvents; degreasers; batteries; auto parts (Tr. 274-275).
114	Silvercote Products Inc. 2630 Industrial Pky.	Mobile home roof coating.	Skids; banding; solvents; roof coating; degreasers (Tr. 279-280).
115	Smead Paint Shop 1834 Fieldhouse Ave.	Autobody shop.	Paint cans; paper; solvents; thinners; degreasers; auto parts (Tr. 282-283).
116	State Wide Aluminum 23601 Co. Rd. 6	Aluminum forming.	Skids; banding; scrap aluminum; wood; cardboard (Tr. 284-285).
117	Taylor Products (formerly Tecumseh, now Orbitron) 1100 W. Beardsley Ave.	Air compressor mfg.	Metal stampings; wood; cardboard; oily rags; degreasers (Tr. 286-287).
118	Textone, Inc. (now Woodtek) 1706 W. Lusher Ave.	Plywood finishing.	Banding; skids; sealants; varnish; drums (Tr. 287-288).
119	Trawood Manufacturing Co. P.O. Box 705	Cabinet mfg.	Wood; banding; cans with paint thinner residue; varnish; glues (Tr. 290-291).
120	U-Rent-it Company, Inc. 1651 Toledo Rd.	Tool rental.	Oily rags; solvents; degreasers; paper (Tr. 293-294).
121	Vernon M. Ball Inc. 123 W. Hively Ave.	Auto maint.	Auto body parts; oil filters; air cleaners; tires; oily rags; auto fluids; batteries (Tr. 59-61).

No.	Customer Name*	Business	Waste
122	Vincent Bach Corp. 600 S. Industrial Pky.	Band instrument mfg.	Fluxes; soldering agents; buffing wheels; scrap metal; brass; paints; lacquers; cutting oil; thinners; skids; cardboard; paper (Tr. 57-59).
123	W. T. Grant	Department store.	Plastic packaging; skids; cardboard (Tr. 381-382).
124	Walker Automatic Heating 329 S. Elkhart Ave.	Heating contractor.	Skids; banding; cardboard; scrap heat ducts (Tr. 297-298).
125	Wee Shape Frames 58211 Co. Rd. 105 S.	Steel fabricator.	Skids; cardboard; banding; paint barrels; thinner; solvents (Tr. 298-300).
126	Wells Cargo, Inc. 1503 W. McNaughton Ave.	Trailer mfg.	Banding; skids; cardboard; paint waste; thinner; solvents; degreasers (Tr. 301-302).
127	Wolohan Lumber & Home Improvement Center 2700 Middlebury	Lumber supplier.	Pallets; banding; wood; paper with mesh netting; treated wood (Tr. 305-306).
128	Workinger Electric, Inc.	Electrical contractor.	Skids; banding; paper; electrical wire; motor parts (Tr. 307-308).
129	Yellowstone, Inc. 2400 Mishawaka St.	Mobile home mfg.	Skids; banding; cardboard; roof coating residue; glues; paints; lacquers; primers; solvents; soldering agents; oil; caulking (Tr. 308-309).

* All addresses are Elkhart, Indiana unless otherwise indicated.

Metal Manufacturing (Including Musical Instrument Manufacturing)

Process

	Materials Used	Hazardous Waste
Metal cutting/ machining	Oils, solvents, metal cuttings	Acid/alkaline wastes Toxic heavy metals (dust and sludge) Spent solvents Toxic wastes
Degreasing	Solvents, acids, alkaline, rags	Acid/alkaline wastes Ignitable wastes Spent solvents Toxic wastes
Metal finishing/ painting	Paints, coatings, solvent cleaning, alkaline cleaning, Lacquers	Acid/alkaline wastes Paint wastes Spent solvents Toxic wastes
Facility cleanup	Solvents, rags, absorbents	Spent solvents
Electroplating	Heavy metals, cyanide solutions, acid and alkaline solutions, plating solutions	Acid/alkaline wastes Cyanide Toxic heavy metals Plating wastes Reactive waste

Construction (Including Manufactured Housing And Recreational Vehicles)

Process	Materials Used	Hazardous Waste
Paint preparation and painting	Paint thinners, enamel reducers, paints, enamels, lacquers, epoxies, acrylics, primers, solvents	Ignitable wastes Toxic wastes Spent solvents Paint wastes
Carpentry and floorwork	Adhesives, solvents, polishes and varnishes, treated wood	Spent solvents Toxic wastes
Other specialty contracting activities	Adhesives, paints coatings, polishes, varnishes, solvents, petroleum products	Ignitable wastes Toxic wastes Spent solvents
Heavy construction	Motor oil and other petroleum products, asphalt	Used oil Asphalt wastes
Demolition		Wreckage and debris may contain ignitable or toxic substances, Used oil
Vehicle and equipment maintenance for construction activities	Degreasers and cleaners, motor oil and other petroleum products, Solvents, rust removers	Spent solvents Acid/alkaline wastes Ignitable wastes Toxic waste Used oil

Vehicle Maintenance Operations

Process	Materials Used	Hazardous Wastes
Degreasing	Degreasers (gunk), carburetor cleaners, engine cleaners, solvents, acids/alkalies, cleaning fluids	Acid/alkaline wastes Spent solvents Ignitable wastes Toxic wastes
Rust removal	Naval jelly, strong acids, strong alkalies	Acid/alkaline wastes
Painting	Paint thinners, enamels, lacquers epoxies, alkyds, acrylics, primers, solvents	Paint wastes Spent solvents Ignitable wastes Toxic wastes
Spray booth, spray guns, & brush cleaning	Paint thinners, enamel reducers, white spirits	Paint wastes Spent solvents Toxic wastes
Tank cleanout	Solvents or cleaners to wash out tanks, residues	Tank draws containing toxic residues
Installing lead-acid batteries	Used batteries of cars, trucks, boats, motor-cycles, and other vehicles	Acid/alkaline wastes Batteries (lead-acid)

Chemical Manufacturers (Including Plastics, Putties and Synthetic Fibers)

Process	Materials Used	Hazardous Wastes
Rubber manufacturing	Monomers, solvents, paints, catalysts	Toxic heavy metal wastes Toxic or ignitable paint wastes Toxic wastewaters and sludges Other toxic wastes Oily wastes Solvent wastes Waste rubber solids
Synthetic fiber manufacturing: non-cellulosic (acrylic, nylon, polyester)	Pigments, solvents, bleaches, lubricants, dyeing assistants, stabilizers, delustrants, brighteners, polymeric materials	Still bottoms Solvent wastes Reactive wastes Toxic heavy metal wastes Toxic wastewaters and sludges Other toxic wastes

Wood Manufacturing And Refinishing

Process	Materials Used	Hazardous Wastes
Wood cleaning/wax removal	Petroleum distillates, white spirits	Ignitable wastes Toxic wastes Spent solvents
Refinishing/stripping	Paint removers, varnish removers, enamel removers, shellac removers, paint solvents, turpentine	Ignitable wastes Toxic wastes Paint wastes Spent solvents
Painting/staining	Stains, enamels, lacquers, epoxies, alkyds, acrylics	Ignitable wastes Toxic wastes Paint wastes Spent solvents
Finishing	Varnish, shellac, polyurethane, lacquers, wood treatments, polish	Ignitable wastes Toxic wastes Spent solvents Solvent still bottoms
Brush cleaning & spray gun cleaning	Paint thinners, enamel reducers, varnish removers, shellac removers, white spirits	Ignitable wastes Toxic wastes Spent solvents Solvent still bottoms

Printing And Allied Industries

Process	Materials Used	Hazardous Waste
Using ink (lithography, letterpress, screen printing, flexography)	Pigments, dyes, varnish, drier, extender, modifier, fountain solutions	Toxic waste ink with solvents/chromium/lead/ barium. Ink sludges with chromium/lead/barium

Environmental Protection Agency

Solid Waste and Emergency Response (OS-305)

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EPA

Does Your Business Produce Hazardous Waste? Many Small Businesses Do

Waste Minimization Should Be the Key Component of Your Company's Hazardous Waste Management Program

UPDATED EDITION

TCLP TOXICITY

WASTE MINIMIZATION

Wood Preserving

Industry Overview

Not all wood preserving operations produce hazardous waste. If, however, you use arsenical compounds, pentachlorophenol, or creosote, you are probably subject to Resource Conservation and Recovery Act (RCRA) requirements covering the generation, transportation, and management of hazardous waste.

Wood preservation involves two general steps: pretreatment (reducing the moisture content of the wood) and preservation (permeating the wood with a preserving agent). A typical wood preserving operation uses any of the following processes: steaming, inorganic salt treatment, boultonizing, or kiln or air drying utilizing one or more of the three principal wood preserving agents:

- Creosote
- Pentachlorophenol (PCP)
- Inorganic arsenical compounds (CCA - Chromated Copper Arsenate or ACA -Ammoniacal Copper Arsenate).

Hazardous Wastes from Wood Preserving

The wastewater treatment sludge generated from wood preserving processes that use creosote and/or pentachlorophenol is listed by EPA as a hazardous waste. EPA might list additional wood preserving wastes in the future. Waste from using inorganic arsenicals is frequently a hazardous waste if it contains either chromium or arsenic at levels high enough to fail the Toxicity Characteristic Leaching Procedure (TCLP). Other wastes from wood preserving operations might fail the TCLP test if they contain high levels of creosols, phenol, or pentachlorophenol.

Table 1 lists general operations/processes that use hazardous materials and that might generate hazardous waste. If you generate 100 kilograms (220 pounds or about half of a 55-gallon drum) or more of hazardous waste per month, you must fill out a Uniform Hazardous Waste Manifest when you ship the hazardous waste off your property. The Manifest requires the proper Department of Transportation (DOT) description for each waste. Table 2 lists proper DOT shipping descriptions for a number of wastes that might be generated during wood preserving. Table 1 and Table 2 are not comprehensive lists. If you suspect you generate other hazardous wastes, contact your state hazardous waste management agency or EPA Regional office for assistance.

Waste Minimization

An effective waste minimization program can reduce the costs, liabilities, and regulatory burdens of hazardous waste management, while potentially enhancing efficiency, product quality, and community relations. Waste minimization techniques that can help you reduce the amount of hazardous waste that you generate include:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Raw material substitution
- Loss prevention and housekeeping
- Waste segregation and separation
- Recycling.

Training and supervision of employees implementing waste minimization techniques is an important part of your successful program. Call the RCRA/Superfund Hotline toll-free at 800-424-9346 (or TDD 800-553-7672 for the hearing-impaired) for waste minimization information and publications.

Table 1
Typical Wood Preserving Operations: Materials Used and Hazardous Wastes that Might be Generated

Process/ Operation	Materials Used	Typical Material Ingredient	General Types of Waste Generated
Steam Preconditioning	Organic solvents, preservatives	Pentachlorophenol, xylol, stoddard solvent, arsenic, creosote	Wastewater treatment sludges Toxic heavy metal wastes Solvent wastes Toxic organic wastes
Boulton Precon-ditioning	Preservatives	Pentachlorophenol, arsenic, creosote	Wastewater treatment sludges Toxic heavy metal wastes Toxic organic wastes
Inorganic Salt Treatment	Inorganic salts, preservatives	Arsenic, borates, ammonium compounds	Wastewater treatment sludges Toxic heavy metal wastes
Non-pressure Treatment Preservation (with air or kiln drying)	Preservatives	Arsenic, chromium, chromated copper arsenate (CCA), creosote	Toxic heavy metal wastes Toxic organic wastes

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Table 2
Wood Preserving Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
WOOD PRESERVING WASTES CONTAINING:				
Creosote		Hazardous Waste, Liquid or Solid, NOS[2]	ORM-E	NA9189
Cresols*		Waste Cresol	Corrosive Material	UN2076
Pentachlorophenol*		Waste Pentachlorophenol, Liquid or Solid	ORM-E	NA2020
Chromated Copper Arsenate		Waste Arsenical Compounds, Solids Waste Arsenical Compounds, Liquids	Poison B Poison B	UN1557 UN1556
Ammoniacal Copper Arsenate		Waste Arsenical Compounds, Solids Waste Arsenical Compounds, Liquids	Poison B Poison B	UN1557 UN1556
Other Wood Preserving Wastes		Hazardous Waste, Liquid or Solid, NOS	ORM-E	NA9189

* Toxicity Characteristic constituent. Any waste that results in a TCLP extract containing a Toxicity Characteristic constituent equal to or above regulatory levels is hazardous.

1 These descriptions may change given variations in waste characteristics and conditions. Note that the DOT shipping name, hazard class, and UN/NA ID number do not directly correspond to RCRA hazardous waste categories.

2 NOS -- Not otherwise specified.

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For further information call the RCRA/Superfund Hotline 1-800-424-9346

Motor Freight Terminals/Railroad Transportation

Industry Overview

If your business is in the motor freight terminals/railroad transportation category, the products you use or transport might contain hazardous materials and the waste you generate might be hazardous waste. If you generate hazardous waste, you might be subject to Resource Conservation and Recovery Act (RCRA) requirements covering the generation, transportation, and management of hazardous waste.

Your industry is classified under *motor freight terminals/railroad transportation* if you are primarily engaged in:

- The operation of terminal facilities used by highway vehicles
- The maintenance and service of trucks and other highway vehicles
- Line haul railroad operations
- The furnishing of terminal facilities for rail passenger or freight traffic for line haul service
- The movement of railroad cars between terminal yards.

Hazardous Wastes from Motor Freight Terminals/Railroad Transportation

Motor freight terminals perform a variety of activities, including loading and unloading packaged goods, cleaning offloaded tank trucks, cleaning and painting trucks, and maintaining highway vehicles. Most of the hazardous wastes included in this summary are generated during maintenance activities; motor freight terminals not equipped with maintenance facilities might not generate some or any of these wastes. Operations that involve cleaning the inside of offloaded tank trucks generate waste that contains small amounts of the substance that was shipped. This waste might also be hazardous.

Waste from the railroad transportation industry predominantly comes from maintenance operations in which trains are cleaned and repaired. Routine operations similar to those carried out by motor freight terminals might generate waste, including strong acid or alkaline materials, spent cleaning and degreasing solvents, ignitable paint wastes, used oil, and lead-acid batteries. In addition, older freight cars with plane bearings might generate lead-contaminated lubricating pads which might also be hazardous.

Table 1 lists typical processes/operations that use products that might contain hazardous materials, and that probably generate hazardous waste. If you generate 100 kilograms (220 pounds or about half of a 55-gallon drum) or more of hazardous waste per month, you must fill out a Uniform Hazardous Waste Manifest when you ship hazardous waste off your property. The Manifest requires the Department of Transportation (DOT) description for each waste. Table 2 lists the DOT shipping descriptions for a number of wastes that might be generated by motor freight terminals and railroad transportation facilities. Table 1 and Table 2 are not comprehensive lists. If you suspect any of your other wastes is hazardous, contact your state hazardous waste management agency or EPA Regional office for assistance.

RCRA has special provisions for spent lead-acid batteries and used oil. You do not have to use a Manifest when you ship used lead batteries that are destined for recycling or used oil that is destined for recycling. If, however, you are disposing of used oil yourself or are sending it offsite for disposal, you generally should handle it as hazardous waste because it is likely to be ignitable or toxic. Special requirements apply if you are burning used oil as fuel. Your state might have its own requirements for lead-acid batteries or used oil; check with your state hazardous waste management agency.

Waste Minimization

An effective waste minimization program can reduce the costs, liabilities, and regulatory burdens of hazardous waste management, while potentially enhancing efficiency, product quality, and community relations. Waste minimization techniques that can help you reduce the amount of hazardous waste that you generate include:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Raw material substitution
- Loss prevention and housekeeping
- Waste segregation and separation
- Recycling.

Training and supervision of employees implementing waste minimization techniques is an important part of your successful program. Call the RCRA/Superfund Hotline toll-free at 800-424-9346 (or TDD 800-553-7672 for the hearing-impaired) for waste minimization information and publications.

EPA/530-SW-90-027k

Table 1

Typical Motor Freight Terminals/Railroad Transportation Operations: Materials Used and Hazardous Wastes that Might be Generated

Process/ Operation	Materials Used	Typical Material Ingredient	General Types of Waste Generated
Unloading and Cleaning Tank Trucks or Cars	Solvents, alkaline cleaners	(see Product Shipping Papers)	Acid/alkaline wastes Toxic wastes Solvent wastes (Residual tank contents)
Degreasing; Engine Parts and Equipment Cleaning	Degreasers (gunk), carburetor cleaners, engine cleaners, solvents, acids/alkalies, cleaning fluids	Petroleum distillates, aromatic hydrocarbons, mineral spirits, benzene, toluene, petroleum naphtha	Acid/alkaline wastes Toxic wastes Ignitable wastes Solvent wastes
Rust Removal	Naval jelly, strong acids, strong alkalies	Phosphoric acid, hydrochloric acid, hydrofluoric acid, sodium hydroxide	Acid/alkaline wastes
Paint Preparation	Paint thinners, enamel reducers, white spirits	Alcohols, petroleum distillates, oxygenated solvents, mineral spirits, ketones	Ignitable wastes Toxic wastes Paint wastes Solvent wastes
Painting	Enamels, lacquers, epoxies, alkyds, acrylics, primers, solvents	Acetone, toluene, petroleum distillates, epoxy ester resins, methylene chloride, xylene, VM&P naphtha, aromatic hydrocarbons, methyl isobutylketones	Ignitable wastes Toxic wastes Paint wastes Solvent wastes
Spray Booth, Spray Guns, and Brush Cleaning	Paint thinners, enamel reducers, solvents, white spirits	Ketones, alcohols, toluene, acetone, isopropyl alcohol, petroleum distillates, mineral spirits	Paint wastes Solvent wastes Toxic wastes
Paint Removal	Solvents, paint thinners, enamel reducers, white spirits	Acetone, toluene, petroleum distillates, methanol, methylene chloride, isopropyl alcohol, mineral spirits, alcohols, ketones, other oxygenated solvents	Paint wastes Solvent wastes Toxic wastes
Changing Lead-Acid Batteries	Batteries of motor freight vehicles	Lead dross	Acid/alkaline wastes Batteries (lead-acid)

Table 2

Motor Freight Terminals/Railroad Transportation Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
STRONG ACID/ALKALINE WASTES				
Ammonium Hydroxide	Ammonium Hydroxide, NH_4OH, Spirit of Hartshorn, Aqua Ammonia	Waste Ammonium Hydroxide (containing not less than 12% but not more than 44% ammonia)	Corrosive Material	NA2672
		(containing less than 12% ammonia)	ORM-A	NA2672
Hydrobromic Acid	Hydrobromic Acid, HBr	Waste Hydrobromic Acid	Corrosive Material	UN1788
Hydrochloric Acid	Hydrochloric Acid, HCl, Muriatic Acid	Waste Hydrochloric Acid	Corrosive Material	NA1789
Hydrofluoric Acid	Hydrofluoric Acid, HF, Fluorohydric Acid	Waste Hydrofluoric Acid	Corrosive Material	UN1790
Nitric Acid	Nitric Acid, HNO_3, Aquafortis	Waste Nitric Acid (over 40%)	Oxidizer	UN2031
		(40% or less)	Corrosive Material	NA1760
Phosphoric Acid	Phosphoric Acid, H_3PO_4, Orthophosphoric Acid	Waste Phosphoric Acid	Corrosive Material	UN1805
Potassium Hydroxide	Potassium Hydroxide, KOH, Potassium Hydrate, Caustic Potash, Potassa	Waste Potassium Hydroxide Solution Dry Solid, Flake, Bead or Granular	Corrosive Material Corrosive Material	UN1814 UN1813
Sodium Hydroxide	Sodium Hydroxide NaOH, Caustic Soda, Soda Lye, Sodium Hydrate	Waste Sodium Hydroxide Solution Dry Solid, Flake, Bead, or Granular	Corrosive Material Corrosive Material	UN1824 UN1823
Sulfuric Acid	Sulfuric Acid, H_2SO_4, Oil of Vitriol	Waste Sulfuric Acid	Corrosive Material	UN1832
Chromic Acid	Chromic Acid	Waste Chromic Acid Solution	Corrosive Material	UN1755
SPENT SOLVENTS AND IGNITABLE OR TOXIC WASTES CONTAINING:				
Ethylene Dichloride*	Ethylene Dichloride, 1,2-Dichloroethane	Waste Ethylene Dichloride	Flammable Liquid[2]	UN1184
Benzene*	Benzene	Waste Benzene (benzol)	Flammable Liquid	UN1114
Toluene	Toluene	Waste Toluene (toluol)	Flammable Liquid	UN1294
Ethyl Benzene	Ethyl Benzene	Waste Ethyl Benzene	Flammable Liquid	UN1175
Chlorobenzene*	Chlorobenzene, Monochlorobenzene, Phenylchloride	Waste Chlorobenzene	Flammable Liquid	UN1134
Methyl Ethyl Ketone*	Methyl Ethyl Ketone, MEK, Methyl Acetone, Meetco, Butanone, Ethyl Methyl Ketone	Waste Methyl Ethyl Ketone	Flammable Liquid	UN1193
Chloroform*	Chloroform	Waste Chloroform	ORM-A	UN1888
Carbon Tetrachloride*	Perchloromethane Tetraform, Carbona Halon 104	Waste Carbon Tetrachloride	ORM-A	UN1846
Hexachloroethane*	Hexachloroethane	Waste Hexachloroethane	ORM-A	NA9037
White Spirits, Varsol	White Spirits, Mineral Spirits, Naphtha	Waste Naphtha	Flammable Liquid	UN2553
1,1,1-Trichloroethane	Aerothene TT, Chlorten, Chloroethane, Methyl Chloroform, Alpha T, Chlorotene	Waste 1,1,1-Trichloroethane	ORM-A	UN2831
Petroleum Distillates	Petroleum Distillates	Petroleum Distillate	Flammable Liquid Combustible Liquid[3]	UN1268 UN1268
PAINT WASTES WITH HEAVY METALS				
Heavy Metal paints with: Lead* Nickel* Chromium*	Heavy Metal Paints	Hazardous Waste, Liquid or Solid, NOS[4]	ORM-E	NA9189

Table 2 (continued)

Motor Freight Terminals/Railroad Transportation Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
OTHER WASTES				
Lead-Acid Batteries	Lead-Acid Batteries	Lead Dross (containing 3% or more free acid)	ORM-C	NA1794
Used Oil	Various petroleum products	Waste Petroleum Oil, NOS	Combustible Liquid	NA1270
		Waste Petroleum Oil, NOS	Flammable Liquid	NA1270
Ignitable Wastes, NOS	Ignitable wastes	Waste Flammable Liquid, NOS	Flammable Liquid	UN1993
		Waste Combustible Liquid, NOS	Combustible Liquid	NA1993
		Waste Flammable Solid, NOS	Flammable Solid	UN1325
Hazardous Waste, NOS		Hazardous Waste, Liquid or Solid, NOS	ORM-E	UN9189

* Toxicity Characteristic constituent. Any waste that results in a TCLP extract containing a Toxicity Characteristic constituent equal to or above regulatory levels is hazardous.

1 These descriptions may change given variations in waste characteristics or conditions. Note that the DOT shipping name, hazard class, and UN/NA ID number do not directly correspond to RCRA hazardous waste categories.

2 A flammable liquid has a flash point below 100°F.

3 A combustible liquid has a flash point between 100°F and 200°F.

4 NOS - Not otherwise specified.

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Metal Manufacturing

Industry Overview

Most metal manufacturing operations produce some hazardous waste. If you use any solvents, strong acid or alkaline solutions, plating solutions, paints, cyanide solutions, or any solutions containing heavy metals, it is likely that your operation generates hazardous waste. Facilities that generate hazardous waste might be subject to Resource Conservation and Recovery Act (RCRA) requirements covering the generation, transportation, and management of hazardous waste.

Your business is classified under *metal manufacturing* if you manufacture:

- Metal furniture, shelves, lockers, cabinets and fixtures
- Primary metal products
- Fabricated metal products
- Machinery, including electrical and electronic machinery, equipment, and supplies
- Storage or primary batteries
- Motor vehicle parts and accessories
- Measuring, analyzing, or controlling instruments (for example, photographic, medical, or optical equipment)
- Other metal items such as clocks and watches; costume and precious metal jewelry; needles, pins, and similar notions; signs and advertising displays; burial caskets; silverware or stainless steel flatware.

Metal manufacturing also includes facilities that are involved in metalworking activities such as:

- Rolling, drawing, and extruding of non-ferrous metals
- Heat treating
- Coating, engraving, and allied services.

Hazardous Wastes from Metal Manufacturing

Metal manufacturing businesses perform many different processes, including machining, grinding, buffing, polishing, tumbling, sand casting, forming, rolling, extruding, forging, ironing, lettering, enameling, cleaning, welding, finishing, die sinking, pickling, coining, degreasing, electrogalvanizing, electroplating, and painting. The wastes associated with these processes fall into several major categories:

Spent solvent and solvent still bottoms result from cleaning and degreasing operations. The types of solvents used include chlorinated solvents (e.g., methylene chloride, dichlorobenzene, carbon tetrachloride, trichloroethylene) or hydrocarbons (e.g., xylene, toluene, benzene). Other solvents are kerosene or mineral spirits ("Stoddard" solvents).

Strong acid wastes are generated in considerable quantity wherever any type of metal is formed or processed. Many pickling solutions are highly acidic; the acid, if not neutralized, might be carried to subsequent manufacturing operations. Subsequent operations can include drawing, rolling, pressing, electroplating, hot dip galvanizing or hot tinning, anodizing, phosphating, metal coloring, and many others.

Strong alkaline wastes are generated from the use of pickled aluminum and sometimes zinc.

Plating wastes are generated from electroplating operations. These wastes can be acidic or alkaline and contain significant concentrations of heavy metals. Acid plating solutions generally contain free acids and heavy metals such as copper, nickel, zinc, and possibly tin or cadmium. Alkaline plating solutions include zinc baths and sometimes tin baths. The waste products from plating can include spent plating solutions or sludges and stripping and cleaning bath solutions.

Heavy metal wastewater sludges are generated from wastewater treatment. Depending on the operation, these sludges can contain arsenic, barium, chromium, cadmium, lead, mercury, silver, or selenium. High concentrations of lead are found in the sludges from battery manufacturing plants. Other sludges can come from grinding, tank clean-outs, dust collectors, and lead pots.

Paint and coating wastes are generated by several segments of the industry. Generally, hazardous paint wastes contain cadmium, chromium, lead and/or mercury. Paints, lacquers, adhesives, and varnishes might contain toxic organic chemicals as well.

Cyanide wastes are generated from cyanide plating solutions and simple cyanide solutions. Cyanide plating solutions are used in metal plating operations. Simple cyanide solutions are used mainly for hardening and metal cleaning. Cyanide baths are commonly used in metal finishing and heat treating operations.

Other ignitable or toxic wastes are generated by the metal manufacturing industry. It is important to determine if your business generates any waste containing chemicals on the Toxicity Characteristic list.

EPA/530-SW-90-027n

Other reactive wastes are generated primarily by the photographic equipment and supplies industry, although other metal manufacturing industries can also generate reactive wastes. These wastes can include strong oxidizing agents such as chromic acid, perchlorates, and permanganates used in metal finishing, and other reactive compounds such as hypochlorites, peroxides, sulfides, nitrates, and sodium hydroxide.

In addition to these wastes, most metal manufacturing industry operations will generate used oil. Oils can come from cutting, lubricating, and/or quenching. RCRA regulations contain special provisions for used oil. You do not have to use a Manifest when shipping used oil that is destined for recycling. If, however, you are disposing of used oil yourself or are sending it offsite for disposal, it generally should be handled as hazardous waste because it is likely to be ignitable or toxic. Special requirements apply if you are burning used oil as fuel. Some states have rules that apply to used oil, and EPA is currently developing new regulations for used oil.

Most metal manufacturers also generate scrap metal. At present, any metal destined for reclamation is not regulated by EPA. Questions concerning used oils, scrap metal and other wastes should be referred to your state hazardous waste management agency or EPA Regional office.

Table 1 lists general operations/processes that use hazardous materials and that might result in the generation of hazardous waste. If you generate 100 kilograms (220 pounds or about half of a 55-gallon drum) or more of hazardous waste per month, you must fill out a Uniform Hazardous Waste Manifest when you ship the hazardous waste off your property. The Manifest requires the proper Department of Transportation (DOT) description for each waste. Table 2 lists proper DOT shipping descriptions for a number of wastes that might be generated by metal manufacturers. Table 1 and Table 2 are not comprehensive lists. If you suspect any waste you generate is hazardous, check with your state hazardous waste management agency or EPA Regional office.

Waste Minimization

An effective waste minimization program can reduce the costs, liabilities, and regulatory burdens of hazardous waste management, while potentially enhancing efficiency, product quality, and community relations. Waste minimization techniques that can help you reduce the amount of hazardous waste that you generate include:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Raw material substitution
- Loss prevention and housekeeping
- Waste segregation and separation
- Recycling.

Training and supervision of employees implementing waste minimization techniques is an important part of your successful program. Call the RCRA/Superfund Hotline toll-free at 800-424-9346 (or TDD 800-553-7672 for the hearing-impaired) for waste minimization information and publications.

Table 1
Typical Metal Manufacturing Operations: Materials Used and Hazardous Wastes that Might be Generated

Process/ Operation	Materials Used	General Types of Waste Generated
Metal Cutting/ Machining	Oils, solvents, lime, metal cuttings	Acid/alkaline wastes Toxic heavy metal wastes (dust and sludge) Solvent wastes Other toxic wastes
Degreasing	Solvents, alkaline wastes, rags	Acid/alkaline wastes Ignitable wastes Solvent wastes Toxic wastes
Pickling	Pickling acids	Acid/alkaline wastes
Heat Treating	Quenching oils, cyanide salts, barium salts, alkaline wastes	Acid/alkaline wastes Cyanide wastes Toxic heavy metal wastes
Metal Finishing and Painting	Paints, coatings, cleaning solvents, alkaline cleaning solutions, lacquers	Acid/alkaline wastes Paint wastes Solvent wastes Toxic wastes
Facility Cleanup	Solvents, rags, absorbents	Solvent wastes
Electroplating	Heavy metals, cyanide solutions, acid and alkaline solutions, plating solutions	Acid/alkaline wastes Cyanide wastes Toxic heavy metal wastes Plating wastes Reactive wastes

Table 2
Metal Manufacturing Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
SPENT SOLVENTS, SOLVENT STILL BOTTOMS, AND OTHER TOXIC WASTES CONTAINING:				
Tetrachloroethylene*	Perchloroethylene, Perc, Tetralex, Perawin, Perelene, Terlen, Didakene, TetraCap, Antisal 1, Fedad-UN, Neme Gemalgene, Perma-A-Chlor, TCE, Benzinol, Dow-Tri, Nialk, Vestrol, Trielin	Waste Tetrachloroethylene or Perchloroethylene	ORM-A	UN1897
Trichloroethylene*	Tri-Clene, Trielene, Tri	Waste Trichloroethylene	ORM-A	UN1710
Methylene Chloride	Aerothene MM, Narkotil	Waste Dichloromethane or Methylene Chloride	ORM-A	UN1593

Table 2 (continued)
Metal Manufacturing Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
1,1,1-Trichloroethane	Aerothene TT, Chlorten, Inhibisol, Chlorothen NU, Alpha-T	Waste 1,1,1-Trichloroethane	ORM-A	UN2831
Carbon Tetrachloride*	Perchloromethane, Tetraform, Carbona, Halon 104	Waste Carbon Tetrachloride	ORM-A	UN1846
Trichlorotrifluoroethane	Fluorocarbon 113, Freon 113,Ucon 113, Freon TF, Frigen 113 113TR-T, Arcton 63	Hazardous Waste, Liquid, NOS[2]	ORM-E	NA9189
Trichlorotrifluoromethane	Eskimon 11, Ucon 11, Isotron 11, Freon 11, Freon MF, Fluorochloroform, Arcton 9	Hazardous Waste, Liquid, NOS	ORM-E	NA9189
Toluene	Toluol, Methercid, Methyl Benzene, Methylbenzol, Phenylmethane, Antisol 1A	Waste Toluene (toluol)	Flammable Liquid[3]	UN1294
Methyl Ethyl Ketone*	Methyl Ethyl Ketone, MEK, Methyl Acetone, Meetco, Butanone, Ethyl Methyl Ketone	Waste Methyl Ethyl Ketone	Flammable Liquid	UN1193
Benzene*	Benzene	Waste Benzene (benzol)	Flammable Liquid	UN1114
Chloroform*	Chloroform	Waste Chloroform	ORM-A	UN1888
o-Dichlorobenzene*	o-Dichlorobenzene	Waste Dichlorobenzene, ortho, Liquid	ORM-A	UN1591
p-Dichlorobenzene*	p-Dichlorobenzene	Waste Dichlorobenzene, para	ORM-A	UN1592
Acetone	Acetone	Waste Acetone	Flammable Liquid	UN1090
Xylene	Xylene, Xylol	Waste Xylene (xylol)	Flammable Liquid	UN1307
White Spirits	Mineral Spirits, Naphtha, Stoddard Solvent	Waste Naphtha	Flammable Liquid	UN2553
Kerosene	Kerosene, Fuel Oil #1	Waste Kerosene	Combustible Liquid[4]	UN1223
Butyl Alcohol	n-Butyl Alcohol, sec-Butyl Alcohol, tert-Butyl Alcohol	Waste Butyl Alcohol	Flammable Liquid	NA1120
STRONG ACID/ALKALINE WASTES				
Ammonium Hydroxide	Ammonium Hydroxide, NH_4OH, Spirit of Hartshorn, Aqua Ammonia	Waste Ammonium Hydroxide (containing not less than 12% but not more than 44% ammonia)	Corrosive Material	NA2672
		(containing less than 12% ammonia)	ORM-A	NA2672
Hydrobromic Acid	Hydrobromic Acid, HBr	Waste Hydrobromic Acid	Corrosive Material	UN1788
Hydrochloric Acid	Hydrochloric Acid, HCl, Muriatic Acid	Waste Hydrochloric Acid	Corrosive Material	NA1789
Hydrofluoric Acid	Hydrofluoric Acid, HF, Fluorohydric Acid	Waste Hydrofluoric Acid	Corrosive Material	UN1790
Nitric Acid	Nitric Acid, HNO_3, Aquafortis	Waste Nitric Acid (over 40%)	Oxidizer	UN2031
		(40% or less)	Corrosive Material	NA1760
Phosphoric Acid	Phosphoric Acid, H_3PO_4, Orthophosphoric Acid	Waste Phosphoric Acid	Corrosive Material	UN1805
Potassium Hydroxide	Potassium Hydroxide, KOH, Potassium Hydrate, Caustic Potash, Potassa	Waste Potassium Hydroxide Solution	Corrosive Material	UN1814
		Dry Solid, Flake, Bead, or Granular	Corrosive Material	UN1813
Sodium Hydroxide	Sodium Hydroxide NaOH, Caustic Soda, Soda Lye, Sodium Hydrate	Waste Sodium Hydroxide Solution	Corrosive Material	UN1824
		Dry Solid, Flake, Bead, or Granular	Corrosive Material	UN1823
Sulfuric Acid	Sulfuric Acid, H_2SO_4, Oil of Vitriol	Waste Sulfuric Acid	Corrosive Material	UN1832
Perchloric Acid	Perchloric Acid	Waste Perchloric Acid (Over 50%-72%)	Oxidizer	UN1873
		Waste Perchloric Acid (50% or less)	Oxidizer	UN1802

Vehicle Maintenance

Industry Overview

If your business is in the vehicle maintenance category, then the products you use on the vehicles and on your equipment, tools, hands, or floor might contain hazardous materials, and the waste generated by using these products might be hazardous waste. If you generate hazardous waste, you might be subject to Resource Conservation and Recovery Act (RCRA) requirements covering the generation, transportation, and management of hazardous waste.

Your business is classified under *vehicle maintenance* if you repair or maintain:

- Vans
- Trucks
- Vehicle Fleets
- Heavy equipment
- Farm equipment.

Vehicle maintenance operations that might generate hazardous waste include:

- Removing oil or grease
- Removing rust, dirt, or paint
- Repairing or rebuilding
- Refinishing or restoring
- Painting
- Replacing lead-acid batteries.

Hazardous Wastes from Vehicle Maintenance

Everyday mechanics and body repair personnel use products containing hazardous materials. Products containing materials that are hazardous to human health and the environment include:

Rust removers that contain strong acid or alkaline solutions

Carburetor cleaners that contain flammable or combustible liquids

Parts cleaners and degreasers that contain toxic chemicals

Paint thinners or reducers that are ignitable or contain toxic constituents

Motor oil and other petroleum products that are ignitable or contain toxic chemicals

Auto and truck batteries.

Waste that is generated as a result of using these products might be RCRA-regulated hazardous waste.

Table 1 lists typical processes/operations that use products that might contain hazardous materials and that probably generate hazardous waste. If you generate 100 kilograms (220 pounds or about half of a 55-gallon drum) or more of hazardous waste per month, you must fill out a Uniform Hazardous Waste Manifest when you ship hazardous waste off your property. The Manifest requires the proper Department of Transportation (DOT) description for each waste. Table 2 lists proper DOT shipping descriptions for a number of wastes that might be generated during vehicle maintenance operations. Table 1 and Table 2 are not comprehensive lists. If you suspect any waste you generate is hazardous, check with your state hazardous waste management agency or Regional EPA office.

There are special provisions in the regulations for spent lead-acid batteries and used oil. You do not have to use a Manifest when you ship used lead batteries that are destined for recycling or used motor oil that is destined for recycling. If, however, you are disposing of used oil yourself or are sending it off-site for disposal, you generally should handle it as hazardous waste because it is likely to be ignitable or toxic. Special requirements apply if you are burning used oil as fuel. Your state might have its own requirements for lead-acid batteries or used oil; check with your state hazardous waste management agency.

Waste Minimization

An effective waste minimization program can reduce the costs, liabilities, and regulatory burdens of hazardous waste management, while potentially enhancing efficiency, product quality, and community relations. Waste minimization techniques that can help you reduce the amount of hazardous waste that you generate include:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Raw material substitution
- Loss prevention and housekeeping
- Waste segregation and separation
- Recycling.

Training and supervision of employees implementing waste minimization techniques is an important part of your successful program. Call the RCRA/Superfund Hotline toll-free at 800-424-9346 (or TDD 800-553-7672 for the hearing-impaired) for waste minimization information and publications.

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EPA/530-SW-90-027a

Table 1

Typical Vehicle Maintenance Operations: Materials Used and Hazardous Wastes that Might be Generated

Process/Operation	Materials Used	Typical Material Ingredient	General Types of Waste Generated
Degreasing	Degreasers (gunk), carburetor cleaners, engine cleaners, solvents, acids/alkalies, cleaning fluids	Petroleum distillates, aromatic hydrocarbons, mineral spirits, benzene, toluene, petroleum naphtha	Acid/alkaline wastes Spent Solvents Ignitable wastes Toxic wastes
Rust Removal	Naval jelly, strong acids, strong alkalies	Phosphoric acid, hydrochloric acid, hydrofluoric acid, sodium hydroxide	Acid/alkaline wastes
Paint Preparation	Paint thinners, enamel reducers, white spirits	Alcohols, petroleum distillates, oxygenated solvents, mineral spirits, ketones	Paint wastes Spent solvents Ignitable wastes Toxic wastes
Painting	Enamels, lacquers, epoxies, alkyds, acrylics, primers, solvents	Acetone, toluene, benzene, petroleum distillates, epoxy ester resins, methylene chloride, xylene, VM&P naphtha, aromatic hydrocarbons, methyl isobutyl, ketones	Paint wastes Spent solvents Ignitable wastes Toxic wastes
Spray Booth, Spray Guns, and Brush Cleaning	Paint thinners, enamel reducers, solvents, white spirits	Ketones, alcohols, toluene, acetone, isopropyl alcohol, petroleum distillates, mineral spirits	Paint wastes Spent solvents Toxic wastes
Paint Removal	Solvents, paint thinners, enamel reducers, white spirits	Acetone, toluene, petroleum distillates, methanol, methylene chloride, isopropyl alcohol, mineral spirits, alcohols, ketones, other oxygenated solvents	Paint wastes Spent solvents Toxic wastes
Tank Cleanout	Solvents or cleaners to wash out tanks, residues	Solvents, petroleum products in tanks	Tank draws containing toxic residues
Installing Lead-Acid Batteries	Used batteries of cars, trucks, boats, motorcycles, and other vehicles	Lead dross	Acid/alkaline wastes Batteries (lead-acid)

Table 2

Vehicle Maintenance Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
STRONG ACID/ALKALINE WASTES				
Ammonium Hydroxide	Ammonium Hydroxide, NH_4OH, Spirit of Hartshorn, Aqua Ammonia	Waste Ammonium Hydroxide (containing not less than 12% but not more than 44% ammonia)	Corrosive Material	NA2672
		(containing less than 12% ammonia)	ORM-A	NA2672
Hydrobromic Acid	Hydrobromic Acid, HBr	Waste Hydrobromic Acid (not more than 49% strength)	Corrosive Material	UN1788
Hydrochloric Acid	Hydrochloric Acid, HCl, Muriatic Acid	Waste Hydrochloric Acid	Corrosive Material	NA1789
Hydrofluoric Acid	Hydrofluoric Acid, HF, Fluorohydric Acid	Waste Hydrofluoric Acid	Corrosive Material	UN1790
Nitric Acid	Nitric Acid, HNO_3, Aquafortis	Waste Nitric Acid (over 40%)	Oxidizer	UN2031
		(40% or less)	Corrosive Material	NA1760
Phosphoric Acid	Phosphoric Acid, H_3PO_4, Orthophosphoric Acid	Waste Phosphoric Acid	Corrosive Material	UN1805
Potassium Hydroxide	Potassium Hydroxide, KOH, Potassium Hydrate, Caustic Potash, Potassa	Waste Potassium Hydroxide Solution Dry Solid, Flake, Bead, or Granular	Corrosive Material Corrosive Material	UN1814 UN1813
Sodium Hydroxide	Sodium Hydroxide NaOH, Caustic Soda, Soda Lye, Sodium Hydrate	Waste Sodium Hydroxide Solution Dry Solid, Flake, Bead, or Granular	Corrosive Material Corrosive Material	UN1824 UN1823
Sulfuric Acid	Sulfuric Acid, H_2SO_4, Oil of Vitriol	Waste Sulfuric Acid	Corrosive Material	UN1830
Chromic Acid	Chromic Acid	Waste Chromic Acid Solution	Corrosive Material	UN1755
SPENT SOLVENTS AND IGNITABLE OR TOXIC WASTES CONTAINING:				
Ethylene Dichloride*	Ethylene Dichloride, 1,2-Dichloroethane	Waste Ethylene Dichloride	Flammable Liquid[2]	UN1184
Benzene*	Benzene	Waste Benzene (benzol)	Flammable Liquid	UN1114
Toluene	Toluene	Waste Toluene (toluol)	Flammable Liquid	UN1294
Ethyl Benzene	Ethyl Benzene	Waste Ethyl Benzene	Flammable Liquid	UN1175
Chlorobenzene*	Chlorobenzene, Monochlorobenzene, Phenylchloride	Waste Chlorobenzene	Flammable Liquid	UN1134
Cresols*	o-Cresol, m-Cresol, p-Cresol, (m,p)-Cresol, (o,m,p)- Cresol	Waste Cresol	Corrosive Material	UN2076
Trichloroethylene*	TCE, Gemalgene, Lanadin, Lethurin, Nialk, Perm-a-Chlor	Waste Trichloroethylene	ORM-A	UN1710
Methyl Ethyl Ketone*	Methyl Ethyl Ketone, MEK, Methyl Acetone, Meetco, Butanone, Ethyl Methyl Ketone	Waste Methyl Ethyl Ketone	Flammable Liquid	UN1193
Chloroform*	Chloroform	Waste Chloroform	ORM-A	UN1888
Carbon Tetrachloride*	Perchloromethane Tetraform, Carbona Halon 104	Waste Carbon Tetrachloride	ORM-A	UN1846
Hexachloroethane*	Hexachloroethane	Waste Hexachloroethane	ORM-A	NA9037
White Spirits, Varsol	White Spirits, Mineral Spirits, Naphtha	Waste Naphtha	Flammable Liquid	UN2553
1,1,1-Trichloroethane	Aerothene TT, Chlorten, Chloroethane, Methyl Chloroform, Alpha T, Chlorotene	Waste 1,1,1-Trichloroethane	ORM-A	UN2831
Petroleum Distillates	Petroleum Distillates	Waste Petroleum Distillate	Flammable Liquid Combustible Liquid[3]	UN1268 UN1268

Table 2 (continued)
Vehicle Maintenance Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
PAINT WASTES WITH HEAVY METALS				
Heavy Metal paints or paint sludges with: Lead* Nickel* Chromium*	Heavy Metal Paints	Hazardous Waste, Liquid or Solid, NOS[4]	ORM-E	NA9189
OTHER WASTES				
Lead-Acid Batteries	Lead-Acid Batteries	Lead Dross (containing 3% or more free acid)	ORM-C	NA1794
Used Oil	Various petroleum products	Waste Petroleum Oil, NOS Waste Petroleum Oil, NOS	Combustible Liquid Flammable Liquid	NA1270 NA1270
Ignitable Wastes, NOS[4]	Ignitable wastes	Waste Flammable Liquid, NOS Waste Combustible Liquid, NOS Waste Flammable Solid, NOS	Flammable Liquid Combustible Liquid Flammable Solid	UN1993 NA1993 UN1325
Hazardous Waste, NOS		Hazardous Waste, Liquid or Solid, NOS	ORM-E	UN9189

* Toxicity Characteristic constituent. Any waste that results in a TCLP leachate containing a Toxicity Characteristic constituent equal to or above regulatory levels is hazardous.

1 These descriptions may change given variations in waste characteristics or conditions. Note that the DOT shipping name, hazard class, and UN/NA ID number do not necessarily correspond to RCRA hazardous waste categories.

2 A flammable liquid has a flash point below 100°F.

3 A combustible liquid has a flash point between 100°F and 200°F.

4 NOS - Not otherwise specified.

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For further information call the RCRA/Superfund Hotline 1-800-424-9346

Furniture/Wood Manufacturing and Refinishing

Industry Overview

Not all furniture/wood manufacturing and refinishing operations produce hazardous waste. If, however, you use any solvents, flammable or combustible liquids, combustible solids, ignitable paints containing flammable solvents, or other materials containing toxic chemicals, the waste generated from using these materials might be hazardous, and you might be subject to Resource Conservation and Recovery Act (RCRA) requirements covering the generation, transportation, and management of hazardous waste.

Your business is included in the *furniture/wood manufacturing and refinishing* category if you manufacture, refinish, reupholster, or repair:

- Wooden kitchen cabinets
- Hardwood veneer, softwood veneer, or plywood
- Particleboard
- Wooden household furniture or upholstered furniture
- Wooden office furniture, lockers, office and store fixtures.

Hazardous Wastes from Furniture/Wood Manufacturing and Refinishing

The furniture/wood manufacturing and refinishing industry uses many solvents. Spent solvents and solvent still bottoms are usually hazardous wastes. In addition to solvent wastes, your facility might generate ignitable wastes or toxic wastes. Many wastes generated from the use of paints, wood treatments, stains, varnishes, polishes, and adhesives might be ignitable or might fail the Toxicity Characteristic Leaching Procedure (TCLP) test. Sawmills and planing mills can generate wastewaters that fail the TCLP test.

Table 1 lists general processes/operations that use hazardous materials and that can result in the generation of hazardous waste. If you generate 100 kilograms (220 pounds or about half of a 55-gallon drum) or more of hazardous waste per month, you must fill out a Uniform Hazardous Waste Manifest when you ship the hazardous waste off your property. The Manifest requires the proper Department of Transportation (DOT) description for each waste. Table 2 lists proper DOT shipping descriptions for a number of wastes that might be generated during furniture and wood manufacturing and refinishing. Table 1 and Table 2 are not comprehensive lists. If you generate a waste that is not in these tables, consult your EPA Regional office or state hazardous waste management agency to determine if your waste is hazardous and to obtain the proper DOT information.

Waste Minimization

An effective waste minimization program can reduce the costs, liabilities, and regulatory burdens of hazardous waste management, while potentially enhancing efficiency, product quality, and community relations. Waste minimization techniques that can help you reduce the amount of hazardous waste that you generate include:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Raw material substitution
- Loss prevention and housekeeping
- Waste segregation and separation
- Recycling.

Training and supervision of employees implementing waste minimization techniques is an important part of your successful program. Call the RCRA/Superfund Hotline toll-free at 800-424-9346 (or TDD 800-553-7672 for the hearing-impaired) for waste minimization information and publications.

Table 1
Typical Furniture Manufacturing and Refinishing Operations: Materials Used and Hazardous Wastes that Might be Generated

Process/ Operation	Materials Used	Typical Material Ingredient	General Types of Waste Generated
Wood Cleaning and Wax Removal	Petroleum distillates, white spirits	Petroleum distillates, mineral spirits	Ignitable wastes Toxic wastes Solvent wastes
Refinishing/ Stripping	Paint removers, varnish removers, enamel removers, shellac removers, paint solvents, turpentine	Acetone, toluene, petroleum distillates, methanol, methylene chloride, alcohols, ketones, oxygenated solvents	Ignitable wastes Toxic wastes Paint wastes Solvent wastes
Staining	Stains	Mineral spirits, alcohol, pigments	Ignitable wastes Toxic wastes Solvent wastes
Painting	Enamels, lacquers, epoxies, alkyds, acrylics	Toluene, pigments, titanium dioxide, epoxy-ester resins, aromatic hydrocarbons, glycol ether, halogenated hydrocarbons, vinyl-acetate acrylic	Ignitable wastes Toxic wastes Paint wastes Solvent wastes
Finishing	Varnish, shellac, polyurethane, lacquers, wood treatments, polish	Denatured alcohols, resins, shellac, petroleum distillates, toluene diisocyanate	Ignitable wastes Toxic wastes Spent solvents Solvent still bottoms
Brush Cleaning and Spray Gun Cleaning	Paint thinners, enamel reducers, varnish removers, shellac removers, white spirits	Acetone, toluene, petroleum distillates, methanol, methylene chloride, isopropanol, mineral spirits, alcohols	Ignitable wastes Toxic wastes Spent solvents Solvent still bottoms

EPA/530-SW-90-027c

Table 2

Furniture/Wood Manufacturing and Refinishing Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
SPENT SOLVENTS AND STILL BOTTOMS AND IGNITABLE OR TOXIC WASTES CONTAINING:				
Ethylene Dichloride*	Ethylene Dichloride, 1,2-Dichloroethane	Waste Ethylene Dichloride	Flammable Liquid[2]	UN1184
Benzene*	Benzene	Waste Benzene (benzol)	Flammable Liquid	UN1114
Toluene	Toluene	Waste Toluene (toluol)	Flammable Liquid	UN1294
Ethyl Benzene	Ethyl Benzene	Waste Ethyl Benzene	Flammable Liquid	UN1175
Chlorobenzene*	Chlorobenzene, Monochlorobenzene, Phenylchloride	Waste Chlorobenzene	Flammable Liquid	UN1134
Methyl Ethyl Ketone*	Methyl Ethyl Ketone, MEK, Methyl Acetone, Meetco, Butanone, Ethyl Methyl Ketone	Waste Methyl Ethyl Ketone	Flammable Liquid	UN1193
Chloroform*	Chloroform	Waste Chloroform	ORM-A	UN1888
Carbon Tetrachloride*	Perchloromethane, Tetraform, Carbona Halon 104	Waste Carbon Tetrachloride	ORM-A	UN1846
Hexachloroethane*	Hexachloroethane	Waste Hexachloroethane	ORM-A	NA9037
Cresols*	o-Cresol, m-Cresol, p-Cresol, (m,p)-Cresol, (o,m,p-Cresol)	Waste Cresol	Corrosive Material	UN2076
Pentachlorophenol*	Pentachlorophenol	Waste Pentachlorophenol, Liquid or Solid	ORM-E	NA2020
Acetone	Acetone	Waste Acetone	Flammable Liquid	UN1090
White Spirits, Varsol	White Spirits, Mineral Spirits, Naphtha	Waste Naphtha	Flammable Liquid	UN2553
Kerosene	Kerosene, Fuel Oil #1	Waste Kerosene	Combustible Liquid[3]	UN1223
Methylene Chloride	Dichloromethane, Methane Dichloride, Methylene Bichloride, NCI-C50102, Solaesthin, Aerothene, Narkotil, Solmethine	Waste Dichloromethane or Methylene Chloride	ORM-A	UN1593
Toluene	Toluene, Methacide, Methylbenzene, Methylbenzol, Phenylmethane, Toluol, Antisal 1A	Waste Toluene (Toluol)	Flammable Liquid	UN1294
Benzene*	Benzene, Benzol	Waste Benzene (Benzol)	Flammable Liquid	UN1114
Ethanol	Ethanol, Ethyl Alcohol	Waste Ethyl Alcohol	Flammable Liquid	UN1770
Phenol*	Phenol	Waste Phenol	Poison B	UN1671
PAINT WASTES WITH HEAVY METALS				
Heavy Metal paints with: Lead* Nickel* Chromium*		Hazardous Waste, Liquid or Solid, NOS[4]	ORM-E	NA9189
OTHER WASTES				
Ignitable Wastes, NOS	Ignitable Wastes NOS, Solvents	Waste Flammable Liquid, NOS Waste Combustible Liquid, NOS Waste Flammable Solid, NOS Waste Petroleum Distillates	Flammable Liquid Combustible Liquid Flammable Solid Flammable Liquid	UN1993 NA1993 UN1325 UN1268
Hazardous Wastes, NOS		Hazardous Waste, Liquid or Solid, NOS	ORM-E	NA9189

* Toxicity Characteristic constituent. Any waste that results in a TCLP extract containing a Toxicity Characteristic constituent equal to or above regulatory levels is hazardous.

1 These descriptions may change given variations in waste characteristics or conditions. Note that the DOT shipping name, hazard class, and UN/NA ID number do not directly correspond to RCRA hazardous waste categories.

2 A flammable liquid has a flash point below 100°F.

3 A combustible liquid has a flash point between 100°F and 200°F.

4 NOS - Not otherwise specified.

B 224303

For further information call the RCRA/Superfund Hotline 1-800-424-9346

Educational and Vocational Shops

Industry Overview

Many educational and vocational institutions do not produce hazardous waste. If, however, you use ignitable solvents, strong acid alkaline solutions, heavy metals, or toxic organic chemicals, the waste you generate might be hazardous. If you generate hazardous waste, you might be subject to Resource Conservation Recovery Act (RCRA) requirements covering the generation, transportation, and management of hazardous waste.

Educational and vocational institutions include shops conducting:

- Automotive and small engine repair
- Automobile body repair
- Metalworking
- Graphic arts production (e.g., printing and photography)
- Woodworking.

Waste generated by laboratories is not addressed in this pamphlet; a separate pamphlet on laboratory waste is available.

Hazardous Wastes from Educational and Vocational Shops

The majority of hazardous waste from educational and vocational shops are:

Solvents (e.g., paint removers, thinners, and cleaning solvents)

Paint waste

Strong acid or alkaline solutions (e.g., cleaning solutions).

Automobile body repair and woodworking operations generate waste solvents and paints. The solvents might be flammable or toxic, and paints might contain heavy metal pigments or hazardous solvents. Metalworking and automotive repair generate waste solvents and acid or alkaline solutions used to clean metal and remove rust.

Graphic arts production can generate several types of waste, depending on the activities. Printing wastes include strong acid solutions used to clean, etch, and coat plates, and solvents used to clean plates, to apply light-sensitive coatings, and to develop plates. The use of inks generates waste containing solvents and/or heavy metals. Photographic wastes include processing solutions, developers, hardeners, and fixing baths. Photographic processing waste might be toxic, ignitable, or corrosive.

RCRA regulations contain special provisions for spent lead-acid batteries and used oil, which might be generated in automotive shops and other shops with heavy machinery. You do not have to use a Manifest when you ship used lead batteries that are destined for recycling or used motor oil that is destined for recycling. If, however, you are disposing of used oil yourself or are sending it offsite for disposal, you generally should handle it as hazardous waste because it is likely to be ignitable or toxic. Special requirements apply if you are burning used oil as fuel. Your state might have its own requirements for lead-acid batteries or used oil; check with your state hazardous waste management agency.

Table 1 lists general operations/processes that use hazardous materials and that might result in the generation of hazardous waste. If you generate 100 kilograms (220 pounds or about half of a 55-gallon drum) or more of hazardous waste per month, you must fill out a Uniform Hazardous Waste Manifest when you ship the hazardous waste off your property. The Manifest requires the proper Department of Transportation (DOT) description for each waste. Table 2 lists proper DOT shipping descriptions for a number of wastes that might be generated by educational and vocational shops. Table 1 and Table 2 are not comprehensive lists. If you do not find your waste here but suspect it is hazardous, contact your EPA Regional office or state hazardous waste management agency for additional information.

Waste Minimization

An effective waste minimization program can reduce the costs, liabilities, and regulatory burdens of hazardous waste management, while potentially enhancing efficiency, product quality, and community relations. Waste minimization techniques that can help you reduce the amount of hazardous waste that you generate include:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Raw material substitution
- Loss prevention and housekeeping
- Waste segregation and separation
- Recycling.

Training and supervision of employees implementing waste minimization techniques is an important part of your successful program. Call the RCRA/Superfund Hotline toll-free at 800-424-9346 (or TDD 800-553-7672 for the hearing-impaired) for waste minimization information and publications.

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Table 1

Typical Educational and Vocational Shops Operations: Materials Used and Hazardous Wastes that Might be Generated

Process/Operation	Materials Used	Typical Material Ingredient	General Types of Waste Generated
AUTOMOBILE ENGINE AND BODY REPAIR, METALWORKING			
Oil and grease removal; metal/tool cleaning; engine, parts, and equipment cleaning	Solvents, carburetor cleaners, degreasers, cleaning fluids, acids/alkalies, engine cleaners	Petroleum distillates, aromatic hydrocarbons, mineral spirits, benzene, toluene, petroleum naphtha	Ignitable waste Solvent waste Combustible solids Waste acid/alkaline solutions
Rust removal	Naval jelly, strong acid/alkaline solutions	Phosphoric acid, hydrochloric acid, hydrofluoric acid, sodium hydroxide	Waste acid/alkaline solutions
Painting	Enamels, lacquers, epoxies, alkyds, acrylics, primers	Acetone, toluene, petroleum distillates, epoxy ester resins, methylene chloride, xylene, VM&P naphtha, aromatic hydrocarbons, methyl isobutyl ketones	Ignitable paint waste Solvent waste Paint waste with heavy metals Ignitable waste
Spray Booth, Spray Guns, Brush Cleaning; Paint Removal/Paint Preparation	Solvents, paint thinners, enamel reducers, white spirits	Acetone, toluene, petroleum distillates, methanol, methylene chloride, isopropanol, mineral spirits, alcohols, ketones, other oxygenated solvents	Ignitable paint waste Heavy metal paint waste Solvent waste
Changing Lead-Acid Batteries	Car, truck, boat, motorcycle, and other vehicle batteries	Lead dross, less than 3% free acids	Lead-acid batteries Strong acid/alkaline solutions
Changing Oil, Lubricating Machinery	Petroleum products	Motor oil, gasoline, lubricants	Used oil
GRAPHIC ARTS - Plate Preparation			
Counter-etching to Remove Oxide	Phosphoric acid	Phosphoric acid	Acid/alkaline waste
Deep-etch Coating of Plates	Deep etch bath	Ammonium dichromate, ammonium hydroxide	Acid/alkaline waste Heavy metal waste
Applying Light Sensitive Coating	Resins, binders, emulsion, photo-sensitizers, gelatin, photo-initiators	PVA/ammonium dichromate, polyvinyl cinnamate, fish glue/albumin, silver halide/gelatin emulsion, gum arabic/ammonium dichromate	Photographic processing waste
Developing Plates	Developer	Lactic acid, zinc chloride, magnesium chloride	Photographic processing waste
Washing/Cleaning Plates	Alcohols, solvents	Ethyl alcohol, isopropyl alcohol, methyl ethyl ketone, trichloroethylene, perchloroethylene	Solvent waste
Applying Lacquer	Resins, solvents, vinyl lacquer	PVC, PVA, maleic acid, methyl ethyl ketone	Solvent waste
Ink Use	Pigments, dyes, varnish, drier, extender, modifier	Titanium oxide, iron blues, molybdated chrome orange, phthalocyanide pigments, oils, hydrocarbon solvents; waxes, cobalt/zinc manganese oleates, plasticizers	Waste ink and ink sludges with chromium or lead
Making Gravure Cylinders	Acid plating bath	Copper, hydrochloric acid	Plating waste
Painting	Solvents, paint with solvents, heavy metals	Ethylene dichloride, benzene, toluene, ethylbenzene, chlorobenzene, methyl ethyl ketone	Ignitable waste Toxic waste Paint waste
WOODWORKING			
Wood Cleaning and Wax Removal	Petroleum distillates, white spirits	Petroleum distillates, mineral spirits	Ignitable waste Solvent waste
Refinishing/Stripping; Brush Cleaning and Spray Gun Cleaning	Paint removers, varnish removers, enamel removers, shellac removers, paint solvents, turpentine	Acetone, toluene, petroleum distillates, mineral spirits, methanol, methylene chloride, alcohols, ketone, oxygenated solvents	Ignitable waste Toxic waste Paint waste Solvent waste
Staining	Stains	Mineral spirits, alcohols, pigments	Ignitable waste Solvent waste
Painting	Enamels, lacquers, epoxies, alkyds, acrylics, primers, solvents	Toluene, pigments, titanium dioxide, epoxy-ester resins, aromatic hydrocarbons, glycol ether, halogenated hydrocarbons, vinyl acetate acrylic	Ignitable waste Toxic waste Paint waste Solvent waste
Finishing	Varnish, shellac, polyurethane, lacquers	Denatured alcohols, resins, shellac, petroleum distillates, toluene diisocyanate	Ignitable waste Toxic waste Solvent waste

Table 2

Educational and Vocational Shops Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
PHOTOGRAPHIC WASTES				
Carbon Tetrachloride*	Carbon Tetrachloride, Perchloromethane, Necatorina, Benzinoform, CCl_4	Waste Carbon Tetrachloride	ORM-A	UN1846
Heavy Metal Solutions	Photographic processing waste containing heavy metals	Hazardous Waste Solution containing Cadmium, Chromium, Lead, and/or Cyanide	ORM-E	NA9189
SPENT SOLVENTS AND OTHER TOXIC OR IGNITABLE WASTES CONTAINING:				
Acetone	Acetone	Waste Acetone	Flammable Liquid[2]	UN1090
White Spirits	White Spirits, Mineral Spirits, Naphtha	Waste Naphtha Waste Naphtha, Solvent Waste Naphtha, Solvent	Combustible Liquid[3] Flammable Liquid Combustible Liquid Flammable Liquid	UN2553 UN2553 UN1256 UN1256
Petroleum Distillate	Petroleum Distillates	Waste Petroleum Distillate	Combustible Liquid Flammable Liquid	UN1268 UN1268
Kerosene	Kerosene, Fuel Oil #1	Waste Kerosene	Combustible Liquid	UN1223
Methylene Chloride	Dichloromethane, Methane Dichloride, Methylene Bichloride, NCI-C50102, Solaesthin, Aerothene, Narkotil, Solmethine	Waste Dichloromethane or Methylene Chloride	ORM-A	UN1593
Toluene	Toluene, Methacide, Methylbenzene, Methylbenzol, Phenylmethane, Toluol, Antisal 1A	Waste Toluene (Toluol)	Flammable Liquid	UN1294
Benzene*	Benzene, Benzol	Waste Benzene (Benzol)	Flammable Liquid	UN1114
Ethanol	Ethanol, Ethyl Alcohol	Waste Ethyl Alcohol	Flammable Liquid	UN1770
Xylene	Xylene, Xylol	Waste Xylene	Flammable Liquid	UN1307
Tetrahydrofuran	Tetrahydrofuran, THF	Waste Tetrahydrofuran	Flammable Liquid	UN2056
Isopropanol	Isopropanol, Isopropyl Alcohol	Waste Isopropanol	Flammable Liquid	UN1219
Ethyl Benzene	Ethyl Benzene	Waste Ethyl Benzene	Flammable Liquid	UN1175
1,1,1-Trichloroethane	1,1,1-Trichloroethane, Aerothene TT, Chlorten, Inhibisol, Trichloroethane, Chloroethene NU, NCI-C04626, Methylchloroform, Chlorothene VG, Chlorothane NU, Chlorotene	Waste 1,1,1-Trichloroethane	ORM-A	UN2831
Trichloroethylene*	Perm-A-Chlor, Trielin, Triline, Triool, Vestrol, Chlorylene, Dow-Tri, Vitran, TCE, Nialk, Philex	Waste Trichloroethylene	ORM-A	UN1710
Ethylene Dichloride*	Ethylene Dichloride, 1,2-Dichloroethane	Waste Ethylene Dichloride	Flammable Liquid	UN1184
Chlorobenzene*	Chlorobenzene, Monochlorobenzene, Phenyl Chloride	Waste Chlorobenzene	Flammable Liquid	UN1134
Methyl Ethyl Ketone*	Methyl Ethyl Ketone, Methyl Acetone, Meetco, Butanone, Ethyl Methyl Ketone, MEK, 2-Butanone	Waste Methyl Ethyl Ketone	Flammable Liquid	UN1193
WASTE INK WITH SOLVENTS OR HEAVY METALS				
Waste Ink	Various ingredients: Carbon Tetrachloride, Chloroform, Methylene Chloride, 1,1,1-Trichloroethane, 1,2-Dichloroethane, Benzene, Toluene, Ethyl Benzene, Tetrachloroethylene, Trichloroethylene, Chromium, Copper, Lead, Zinc, Cyanide, Aluminum, Cadmium, Nickel, Cobalt	Waste Ink	Combustible Liquid Flammable Liquid	UN2867 UN1210
INK SLUDGE WITH CHROMIUM OR LEAD				
Ink sludge with Chromium or Lead	Ink sludge containing heavy metals	Hazardous Waste, Liquid, NOS[4] Hazardous Waste, Solid, NOS	ORM-E ORM-E	NA9189 NA9189

Table 2 (continued)
Educational and Vocational Shops Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
STRONG ACID/ALKALINE WASTES				
Ammonium Hydroxide	Ammonium Hydroxide, NH_4OH, Spirit of Hartshorn, Aqua Ammonia	Waste Ammonium Hydroxide (containing not less than 12% but not more than 44% ammonia)	Corrosive Material	NA2672
		Waste Ammonium Hydroxide (containing less than 12% ammonia)	ORM-A	NA2672
Hydrobromic Acid	Hydrobromic Acid, HBr	Waste Hydrobromic Acid	Corrosive Material	UN1788
Hydrochloric Acid	Hydrochloric Acid, HCl, Muriatic Acid	Waste Hydrochloric Acid	Corrosive Material	NA1789
Hydrofluoric Acid	Hydrofluoric Acid, HF, Fluorohydric Acid	Waste Hydrofluoric Acid	Corrosive Material	UN1790
Nitric Acid	Nitric Acid, HNO_3, Aquafortis	Waste Nitric Acid (over 40%)	Oxidizer	UN2031
		Waste Nitric Acid (40% or less)	Corrosive Material	NA1760
Phosphoric Acid	Phosphoric Acid, H_3PO_4, Orthophosphoric Acid	Waste Phosphoric Acid	Corrosive Material	UN1805
Potassium Hydroxide	Potassium Hydroxide, KOH, Potassium Hydrate, Caustic Potash, Potassa	Waste Potassium Hydroxide Solution	Corrosive Material	UN1814
		Dry Solid, Flake, Bead, or Granular	Corrosive Material	UN1813
Sodium Hydroxide	Sodium Hydroxide, NaOH, Caustic Soda, Soda Lye, Sodium Hydrate	Waste Sodium Hydroxide Solution	Corrosive Material	UN1824
		Dry Solid, Flake, Bead, or Granular	Corrosive Material	UN1823
Sulfuric Acid	Sulfuric Acid, H_2SO_4, Oil of Vitriol	Waste Sulfuric Acid	Corrosive Material	UN1832
Chromic Acid	Chromic Acid	Waste Chromic Acid Solution	Corrosive Material	UN1755
Lacquer, Paint, or Varnish Removing Liquid	Lacquer, Paint, or Varnish Removing Liquid	Waste Compound, Lacquer, Paint, or Varnish Removing Liquid	Corrosive Material	NA1760
SPENT PLATING WASTES				
Spent Plating Wastes	Spent etch baths, spent plating solutions and sludges, stripping and cleaning baths	Hazardous Waste, Liquid, NOS	ORM-E	NA9189
		Hazardous Waste, Solid, NOS	ORM-E	NA9189
OTHER IGNITABLE AND/OR TOXIC WASTES				
Paint Dryer	Paint Dryer	Waste Paint Dryer, Liquid	Combustible Liquid	UN1168
			Flammable Liquid	UN1168
Paint, Enamel, Lacquer, Stain, Shellac, or Varnish; Aluminum, Bronze, Gold, Wood Filler, Liquid or Lacquer Base, Liquid	Paint, Enamel, Lacquer, Stain, Shellac, or Varnish; Aluminum, Bronze, Gold, Wood Filler, Liquid or Lacquer Base, Liquid	Waste Paint, Enamel, Lacquer, Stain, Shellac, or Varnish; Aluminum, Bronze, Gold, Wood Filler, Liquid or Lacquer Base, Liquid	Combustible Liquid	UN1263
			Flammable Liquid	UN1263
Enamel	Enamel	Waste Compound, Enamel	Flammable Liquid	NA1263
Lacquer, Paint, or Varnish Removing, Reducing, or Thinning Liquid	Lacquer, Paint, or Varnish Removing, Reducing, or Thinning Liquid	Waste Compound, Lacquer, Paint, or Varnish, Removing, Reducing, or Thinning Liquid	Combustible Liquid	NA1142
			Flammable Liquid	NA1142
PAINT WASTES WITH HEAVY METALS				
Paint Waste	Paint Waste with Heavy Metals	Hazardous Waste, Liquid, NOS	ORM-E	NA9189
			ORM-E	NA9189
IGNITABLE WASTES NOT OTHERWISE SPECIFIED (NOS)				
Ignitable Wastes, NOS	Ignitable Wastes, NOS	Waste Flammable Liquid, NOS	Flammable Liquid	UN1993
		Waste Combustible Liquid, NOS	Combustible Liquid	NA1993
		Waste Flammable Solid, NOS	Flammable Solid	UN1325
Hazardous Wastes, NOS		Hazardous Wastes, Liquid, Solid, NOS	ORM-E	NA9189

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* Toxicity Characteristic constituent. Any waste that results in a TCLP extract containing a Toxicity Characteristic constituent equal to or above regulatory levels is hazardous.

1 These descriptions may change given variations in waste characteristics or conditions. Note that the DOT shipping name, hazard class, and UN/NA ID number do not directly correspond to RCRA categories of hazardous waste.

2 A flammable liquid has a flash point below 100°F.

3 A combustible liquid has a flash point between 100°F and 200°F.

4 NOS - not otherwise specified.

For further information call the RCRA/Superfund Hotline 1-800-424-9346

Construction

Industry Overview

If your operation is involved in the construction industry you might be subject to Resource Conservation and Recovery Act (RCRA) regulations covering the generation, transportation, and management of hazardous waste. Not all construction industry operations produce hazardous waste, but if you use materials such as strong acid or alkaline solutions, paints, solvents, or petroleum products, the waste generated during their use might be hazardous.

You are included in the *construction industry* if you provide services in the following areas:

- Heavy construction
- Plumbing, heating, and air conditioning
- Painting, paper hanging, and decorating
- Mobile home construction
- Prefabricated wood buildings and components
- Masonry, stonework, tile work, and plastering
- Carpentering and floorwork
- Concrete work
- Roofing and sheet metal work
- Glass and glazing work
- Wrecking and demolition.

Hazardous Wastes From Construction

Hazardous wastes that might be generated during construction fall into several major categories:

Ignitable paint wastes generated by painting and other associated processes, including paint preparation and brush and spray gun cleaning

Other ignitable wastes containing paint and varnish removers, paint brush cleaners, and epoxy resins and adhesives used during processes such as painting, cleaning, and degreasing

Spent solvents from many processes, including painting, cleaning, degreasing, air conditioner maintenance, and fluxing

Wastes containing toxic chemicals. Many products such as adhesives, paints, coatings, polishes, varnishes, thinners, and treated woods contain toxic chemicals. Wastes generated during the use of such products are hazardous wastes if they contain certain levels of toxic chemicals.

Strong acid/alkaline wastes used in cleaning, degreasing, and plumbing operations.

Some businesses generate spent heat transfer boxes that contain PCBs. PCBs are not regulated under RCRA; they are, however, regulated under the Toxic Control Substances Act (TSCA). If you have spent heat transfer boxes, contact your state hazardous waste management agency to determine your responsibilities.

In addition to these wastes, your operations might generate used oil. There are special provisions in the regulations for used oil. Currently most used oil is exempt from EPA hazardous waste regulations if it is recycled. If you recycle your oil, you are not required to use a Uniform Hazardous Waste Manifest, and you do not need to include used oil when determining your monthly hazardous waste generation rate. If, however, you are disposing of used oil yourself or are sending it offsite for disposal, you generally should handle it as hazardous waste because it is likely to be ignitable or toxic. Special requirements apply if you are burning used oil as fuel. EPA is currently developing new regulations for used oil. Some states regulate used oil differently than does EPA; contact your state hazardous waste agency for more information.

Table 1 lists typical processes/operations that use products that might contain hazardous materials and that probably generate hazardous waste. If you produce 100 kilograms (220 pounds or about half of a 55-gallon drum) or more of hazardous waste per month, you must fill out a Uniform Hazardous Waste Manifest when you ship hazardous waste off your property. The Manifest requires the proper Department of Transportation (DOT) description for each waste. Table 2 lists the proper DOT shipping description for a number of wastes that might be generated during equipment repair operations. Table 1 and Table 2 are not comprehensive lists. If you suspect that any waste you generate is hazardous, check with your state hazardous waste agency or EPA Regional office for more information.

Waste Minimization

An effective waste minimization program can reduce the costs, liabilities, and regulatory burdens of hazardous waste management, while potentially enhancing efficiency, product quality, and community relations. Waste minimization techniques that can help you reduce the amount of hazardous waste that you generate include:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Raw material substitution
- Loss prevention and housekeeping
- Waste segregation and separation
- Recycling.

Training and supervision of employees implementing waste minimization techniques is an important part of your successful program. Call the RCRA/Superfund Hotline toll-free at 800-424-9346 (or TDD 800-553-7672 for the hearing-impaired) for waste minimization information and publications.

EPA/530-SW-90-027j

Table 2 (continued)
Construction Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
Kerosene	Kerosene, Fuel Oil #1	Waste Kerosene	Combustible Liquid[3]	UN1223
Cresols*	o-Cresol, m-Cresol, p-Cresol, (m,p)-Cresol, (o,m,p)-Cresol	Waste Cresol	Corrosive Material	UN2076
Trichloroethylene*	TCE, Gemalgene, Lanadin, Lethurin, Nialk, Perm-a-Chlor	Waste Trichloroethylene	ORM-A	UN1710
Mineral Spirits	White Spirits, Naphtha	Waste Naphtha	Flammable Liquid	UN2553
Acetone	Acetone	Waste Acetone	Flammable Liquid	UN1090
STRONG ACID/ALKALINE WASTES				
Ammonium Hydroxide	Ammonium Hydroxide, NH_4OH, Spirit of Hartshorn, Aqua Ammonia	Waste Ammonium Hydroxide (containing not less than 12% but not more than 44% ammonia)	Corrosive Material	NA2672
		(containing less than 12% ammonia)	ORM-A	NA2672
Hydrobromic Acid	Hydrobromic Acid, HBr	Waste Hydrobromic Acid	Corrosive Material	UN1788
Hydrochloric Acid	Hydrochloric Acid, HCl, Muriatic Acid	Waste Hydrochloric Acid	Corrosive Material	NA1789
Hydrofluoric Acid	Hydrofluoric Acid, HF, Fluorohydric Acid	Waste Hydrofluoric Acid	Corrosive Material	UN1790
Nitric Acid	Nitric Acid, HNO_3, Aquafortis	Waste Nitric Acid (over 40%) (40% or less)	Oxidizer Corrosive Material	UN2031 NA1760
Phosphoric Acid	Phosphoric Acid, H_3PO_4, Orthophosphoric Acid	Waste Phosphoric Acid	Corrosive Material	UN1805
Potassium Hydroxide	Potassium Hydroxide, KOH, Potassium Hydrate, Caustic Potash, Potassa	Waste Potassium Hydroxide Solution	Corrosive Material	UN1814
		Dry Solid, Flake, Bead, or Granular	Corrosive Material	UN1813
Sodium Hydroxide	Sodium Hydroxide, NaOH, Caustic Soda, Soda Lye, Sodium Hydrate	Waste Sodium Hydroxide Solution	Corrosive Material	UN1824
		Dry Solid, Flake, Bead, or Granular	Corrosive Material	UN1823
Sulfuric Acid	Sulfuric Acid, H_2SO_4, Oil of Vitriol	Waste Sulfuric Acid, Spent	Corrosive Material	UN1832
OTHER WASTES				
Ignitable Wastes, NOS	Ignitable Wastes, NOS[4]	Waste Flammable Liquid, NOS Waste Combustible Liquid, NOS Waste Flammable Solid, NOS	Flammable Liquid Combustible Liquid Flammable Solid	UN1993 NA1993 UN1325
Used Oil	Various petroleum products	Waste Petroleum Oil, NOS Waste Petroleum Oil, NOS	Combustible Liquid Flammable Liquid	NA1270 NA1270
Asphalt	Asphalt	Waste Asphalt, at or above its flashpoint	ORM-C	NA1999
		Waste Asphalt, cut back	Flammable Liquid Combustible Liquid	NA1999 NA1999
Hazardous Waste, NOS		Hazardous Waste, NOS	ORM-E	UN9189

* *Toxicity Characteristic constituent. Any waste that results in a TCLP extract containing a Toxicity Characteristic constituent equal to or above regulatory levels is hazardous.*

1 These descriptions may change given variations in waste characteristics or conditions. Note that the DOT shipping name, hazard class, and UN/NA ID number do not directly correspond to RCRA hazardous waste categories.

2 A flammable liquid has a flash point below 100°F.

3 A combustible liquid has a flash point between 100°F and 200°F.

4 NOS - Not otherwise specified.

Chemical Manufacturers

Industry Overview

Chemical manufacturers produce a large variety of hazardous wastes that might be subject to Resource Conservation and Recovery Act (RCRA) requirements covering the generation, transportation, and management of hazardous waste.

Your business is included in the *chemical manufacturers* category if you manufacture:

- Industrial inorganic chemicals
- Industrial organic chemicals
- Pigments
- Plastics
- Pesticides
- Synthetic rubber
- Explosives
- Synthetic fibers
- Gum and wood chemicals.

Hazardous Wastes from Chemical Manufacturing

The many different processes used in the chemical manufacturing industry result in a large number of specific wastes. Typical wastes from chemical manufacturing plants include spent solvents, distillation bottoms and side-cuts, off-specification or unused chemicals, wastewater, wastewater treatment sludge, emission control sludges, filter cake, spent catalysts, byproducts, reactor cleanout wastes, and container residues. Many wastes from chemical manufacturing (e.g., spent solvents and off-specification chemicals) are listed wastes. Toxicity Characteristic Leaching Procedure (TCLP) toxic constituents have been detected in many other chemical manufacturing wastes.

Table 1 provides a general description of chemical manufacturing waste types. If you generate more than 100 kilograms (220 pounds or about half of a 55-gallon drum) of hazardous waste per month, you must complete a Uniform Hazardous Waste Manifest when you ship your waste. The Manifest requires the DOT (Department of Transportation) description of the waste, including shipping name, hazard class, and UN/NA ID number. This information can be found in Table 2 for a number of wastes that chemical manufacturers might generate. Table 1 and Table 2 are not comprehensive lists. If you suspect that you generate a hazardous waste that is not on this list, contact your state hazardous waste management agency or EPA Regional office for assistance.

Waste Minimization

An effective waste minimization program can reduce the costs, liabilities, and regulatory burdens of hazardous waste management, while potentially enhancing efficiency, product quality, and community relations. Waste minimization techniques that can help you reduce the amount of hazardous waste that you generate include:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Raw material substitution
- Loss prevention and housekeeping
- Waste segregation and separation
- Recycling.

Training and supervision of employees implementing waste minimization techniques is an important part of your successful program. Call the RCRA/Superfund Hotline toll-free at 800-424-9346 (or TDD 800-553-7672 for the hearing-impaired) for waste minimization information and publications.

EPA/530-SW-90-027h

Table 1
Typical Chemical Manufacturing Operations: Materials Used and Hazardous Wastes that Might be Generated

Process/ Operation	Materials Used	General Types of Waste Generated
Pigment Manufacturing	Acids/alkalies, heavy metals (catalysts and salts), solvents, petroleum distillates	Acid/alkaline wastes Heavy metal wastes (dust and sludge) Heavy metal wastes (solutions) Solvent wastes Toxic organic liquids Toxic wastewaters and sludges
Pesticide Manufacturing	Pesticides, carriers, dispensing agents, solvents	Pesticide wastes Ignitable wastes Solvent wastes Toxic wastes
Synthetic Fiber Manufacturing: Cellulosic Fibers	Cellulose acetate/rayon pigments, solvents, bleaches, lubricants, dyeing assistants, stabilizers, delustrants, brighteners	Toxic heavy metal wastes Toxic wastewaters and sludges Other toxic wastes Solvent wastes Reactive wastes
Synthetic Fiber Manufacturing: Non-cellulosic (acrylic, nylon, polyester)	Pigments, solvents, bleaches, lubricants, dyeing assistants, stabilizers, delustrants, brighteners, polymeric materials	Still bottoms Solvent wastes Reactive wastes Toxic heavy metal wastes Toxic wastewaters and sludges Other toxic wastes

Table 1 (continued)
Typical Chemical Manufacturing Operations: Materials Used and Hazardous Wastes that Might be Generated

Process/ Operation	Materials Used	General Types of Waste Generated
Rubber Manufacturing	Monomers, solvents, paints, catalysts	Toxic heavy metal wastes Toxic or ignitable paint wastes Toxic wastewaters and sludges Other toxic wastes Oily wastes Solvent wastes Waste rubber solids
Other Chemical Manufacturing	Solvents, chemicals, catalysts, acids/alkalies, heavy metals	Acid/alkaline wastes Toxic heavy metal wastes (dust and sludge) Other toxic wastes Ignitable wastes Reactive wastes (other) Solvent wastes Spent catalysts Emission control dusts and sludges

Table 2
Chemical Manufacturing Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
SPENT SOLVENTS, SOLVENT STILL BOTTOMS[2], AND IGNITABLE OR TOXIC WASTES CONTAINING:				
White Spirits	White Spirits, Mineral Spirits, Naphtha	Waste Naphtha Waste Naphtha Waste Naphtha, Solvent Waste Naphtha, Solvent	Combustible Liquid[3] Flammable Liquid[4] Combustible Liquid Flammable Liquid	UN2553 UN2553 UN1256 UN1256
Kerosene	Kerosene, Fuel Oil #1	Waste Kerosene	Combustible Liquid	UN1223
Benzene*	Benzene	Waste Benzene (Benzol)	Flammable Liquid	UN1114
Ethyl Benzene	Ethyl Benzene	Waste Ethyl Benzene	Flammable Liquid	UN1175
Toluene	Toluene, Methacide, Methylbenzene, Methylbenzol, Phenylmethane, Toluol, Antisal 1A	Waste Toluene (Toluol)	Flammable Liquid	UN1294
Toluene Diisocyanate	Toluene Diisocyanate	Waste Toluene Diisocyanate	Poison B	UN2078
Xylene	Xylene, Xylol	Waste Xylene	Flammable Liquid	UN1307
Ethanol	Ethanol, Ethyl Alcohol	Waste Ethyl Alcohol	Flammable Liquid	UN1170
Isopropanol	Isopropanol, Isopropyl Alcohol	Waste Isopropanol	Flammable Liquid	UN1219
Acetone	Acetone	Waste Acetone	Flammable Liquid	UN1090
Methyl Ethyl Ketone*	Methyl Ethyl Ketone	Waste Methyl Ethyl Ketone	Flammable Liquid	UN1193
Tetrahydrofuran	Tetrahydrofuran, THF	Waste Tetrahydrofuran	Flammable Liquid	UN2056
Methylene Chloride	Dichloromethane, Methane Dichloride, Methylene Bichloride, NCI-C50102, Solaesthin, Aerothene, Narkotil, Solmethine	Waste Dichloromethane or Methylene Chloride	ORM-A	UN1593

Table 2 (continued)
Chemical Manufacturing Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
1,1,1-Trichloroethane	1,1,1-Trichloroethane, Aerothene TT, Chloroten, Inhibisol, Trichloroethane, Chlorothene NU, NCI-C04626, Methylchloroform, Chlorothene VG, Chlorothane NU, Chlorotene	Waste 1,1,1-Trichloroethane	ORM-A	UN2831
Trichloroethylene*	Perm-A-Chlor, Trielin, Triline, Triol, Vestrol, Chlorylene, Dow-Tri, Vitran, TCE, Nialk, Philex	Waste Trichloroethylene	ORM-A	UN1710
Chlorobenzene*	Chlorobenzene, Monochlorobenzene, Phenylchloride	Waste Chlorobenzene	Flammable Liquid	UN1134
Chloroform*	Chloroform	Waste Chloroform	ORM-A	UN1888
Carbon Tetrachloride*	Perchloromethane Tetraform, Carbona Halon 104	Waste Carbon Tetrachloride	ORM-A	UN1846
Ethylene Dichloride*	Ethylene Dichloride, 1,2-Dichloroethane	Waste Ethylene Dichloride	Flammable Liquid	UN1184
Hexachloroethane*	Hexachloroethane	Waste Hexachloroethane	ORM-A	NA9037
Tetrachloroethylene	TCE, Gemalgene, Lanadin, Lethurin, Nialk, Perm-a-Chlor	Waste Trichloroethylene	ORM-A	UN1710
Phenol	Phenol	Waste Phenol	Poison B	UN1671
Cresols	o-Cresol, m-Cresol, p-Cresol, (m,p)-Cresol, (o,m,p)-Cresol	Waste Cresol	Corrosive Material	UN2076
OTHER IGNITABLE WASTES				
Ignitable Wastes	Ignitable Wastes	Waste Flammable Liquid, NOS[5] Waste Combustible Liquid, NOS Waste Flammable Solid, NOS	Flammable Liquid Combustible Liquid Flammable Solid	UN1993 NA1993 UN1325
OTHER TOXIC WASTES				
Hazardous Waste		Hazardous Waste, Liquid or Solid, NOS	ORM-E	UN9189
STRONG ACID/ALKALINE WASTES				
Ammonium Hydroxide	Ammonium Hydroxide, NH_4OH, Spirit of Hartshorn, Aqua Ammonia	Waste Ammonium Hydroxide (containing not less than 12% but not more than 44% ammonia)	Corrosive Material	NA2672
		(containing less than 12% ammonia)	ORM-A	NA2672
Hydrobromic Acid	Hydrobromic Acid, HBr	Waste Hydrobromic Acid	Corrosive Material	UN1788
Hydrochloric Acid	Hydrochloric Acid, HCl, Muriatic Acid	Waste Hydrochloric Acid	Corrosive Material	NA1789
Hydrofluoric Acid	Hydrofluoric Acid, HF, Fluorohydric Acid	Waste Hydrofluoric Acid	Corrosive Material	UN1790
Nitric Acid	Nitric Acid, HNO_3, Aquafortis	Waste Nitric Acid (over 40%)	Oxidizer	UN2031
		(40% or less)	Corrosive Material	NA1760
Phosphoric Acid	Phosphoric Acid, H_3PO_4, Orthophosphoric Acid	Waste Phosphoric Acid	Corrosive Material	UN1805
Potassium Hydroxide	Potassium Hydroxide, KOH, Potassium Hydrate, Caustic Potash, Potassa	Waste Potassium Hydroxide Solution Dry Solid, Flake, Bead, or Granular	Corrosive Material Corrosive Material	UN1814 UN1813
Sodium Hydroxide	Sodium Hydroxide NaOH, Caustic Soda, Soda Lye, Sodium Hydrate	Waste Sodium Hydroxide Solution Dry Solid, Flake, Bead, or Granular	Corrosive Material Corrosive Material	UN1824 UN1823
Sulfuric Acid	Sulfuric Acid, H_2SO_4, Oil of Vitriol	Waste Sulfuric Acid	Corrosive Material	UN1832
Chromic Acid	Chromic Acid	Waste Chromic Acid Solution	Corrosive Material	UN1755

Table 2 (continued)
Chemical Manufacturing Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
OTHER REACTIVE WASTES				
Hypochlorite	Hypochlorite, Sodium Hypochlorite (or other salts), Hypochlorous Acid, Clorox	Waste Hypochlorite solution (containing not more than 7% available chlorine by weight)	ORM-B	UN1791
		Waste Hypochlorite solution (containing more than 7% available chlorine by weight)	Corrosive Material	NA1791
Organic Peroxides	Organic Peroxide	Waste Organic Peroxide, Liquid or Solution, NOS	Organic Peroxide	NA9183
Sodium Perchlorates	Sodium Perchlorate	Waste Sodium Perchlorate	Oxidizer	UN1502
Potassium Permanganate	Potassium Permanganate	Waste Potassium Permanganate	Oxidizer	UN1490
Sodium Permanganate	Sodium Permanganate	Waste Sodium Permanganate	Oxidizer	UN1503
Potassium Sulfide	Potassium Sulfide	Waste Potassium Sulfide	Flammable Solid	UN1382
Sodium Sulfide	Sodium Sulfide, Sodium Sulfuret	Waste Sodium Sulfide, Anhydrous	Flammable Solid	UN1385
EMISSION CONTROL DUSTS AND SLUDGES				
Flue Dusts from degassing agents used in glass production	Heavy metal dust containing Arsenic, Barium, Cadmium, Chromium, Mercury, Lead, Silver, and/or Selenium	Hazardous Waste, Solid, NOS	ORM-E	NA9189
SPENT CATALYSTS				
Waste heavy metal catalysts from plastic materials, synthetic spinning and polymerization	Heavy metal sludges with organics containing Antimony, Cadmium, Cobalt, Manganese, and/or Zinc	Hazardous Waste (Liquid or Solid), NOS	ORM-E	NA9189

* Toxicity Characteristic constituent. Any waste that results in a TCLP extract containing a Toxicity Characteristic constituent equal to or above regulatory levels is hazardous.

1 These descriptions may change given variations in waste characteristics and conditions. Note that the DOT shipping name, hazard class and UN/NA ID number do not directly correspond to RCRA hazardous waste categories.

2 Still bottoms may not be hazardous if the concentrations of the hazardous materials in the still bottom are sufficiently low.

3 Formulations with a flash point less than 200°F and greater than or equal to 100°F.

4 Formulations with a flash point less than 100°F.

5 NOS — Not otherwise specified.

Equipment Repair

Industry Overview

Not all equipment repair operations produce hazardous waste. If, however, you use any solvents, petroleum products, paints, special parts cleaners and fluids, or lacquers, the waste generated from using these materials might be hazardous. If you generate hazardous waste, you might be subject to Resource Conservation and Recovery Act (RCRA) requirements covering the generation, transportation, and management of hazardous waste.

Your business is included in the *equipment repair* category if you operate a:

- Radio and/or television repair shop
- Refrigeration and air conditioning service or repair shop
- Miscellaneous equipment shop (e.g., electrical household appliances or industrial equipment)

or if you repair equipment used for:

- Pipelines (except natural gas)
- Communications
- Power generation transmission
- Automatic merchandising machines
- Amusement parks.

Hazardous Wastes from Equipment Repair

Everyday mechanics and repair personnel use products containing hazardous materials. Products that contain materials that are hazardous to human health and the environment include:

Rust removers that contain strong acid or alkaline solutions

Degreasers that contain ignitable liquids and toxic chemicals

Paint thinners or reducers that are ignitable and/or contain toxic chemicals

Paints and coatings with heavy metals or toxic constituents.

Table 1 lists typical operations/processes that use products that might contain hazardous materials and that probably generate hazardous waste. If you generate 100 kilograms (220 pounds or about half of a 55-gallon drum) or more of hazardous waste per month, you must fill out a Uniform Hazardous Waste Manifest when you ship hazardous waste off your property. The Manifest requires the Department of Transportation (DOT) description for each waste. Table 2 lists the proper DOT shipping descriptions for a number of wastes that might be generated during equipment repair operations. Table 1 and Table 2 are not comprehensive lists. If you suspect that any waste you are generating is hazardous, check with your state hazardous waste management agency or EPA Regional office.

There are special provisions in the regulations for used oil. You do not have to use a Manifest when you ship used motor oil that is destined for recycling. If, however, you are disposing of used oil yourself or are sending it offsite for disposal, you generally should handle it as hazardous waste because it is likely to be ignitable or toxic. There are special requirements that apply if you are burning used oil as fuel. Your state might have its own requirements for used oil; check with your state hazardous waste management agency.

Waste Minimization

An effective waste minimization program can reduce the costs, liabilities, and regulatory burdens of hazardous waste management, while potentially enhancing efficiency, product quality, and community relations. Waste minimization techniques that can help you reduce the amount of hazardous waste that you generate include:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Raw material substitution
- Loss prevention and housekeeping
- Waste segregation and separation
- Recycling.

Training and supervision of employees implementing waste minimization techniques is an important part of your successful program. Call the RCRA/Superfund Hotline toll-free at 800-424-9346 (or TDD 800-553-7672 for the hearing-impaired) for waste minimization information and publications.

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Table 1

Typical Equipment Repair Operations: Materials Used and Hazardous Wastes that Might be Generated

Process/Operation	Materials Used	Typical Material Ingredient	General Types of Waste Generated
Degreasing: Engine, Parts, and Equipment Cleaning	Degreasers (gunk), carburetor cleaners, engine cleaners, solvents, acids/alkalies, cleaning fluids	Petroleum distillates, aromatic hydrocarbons, mineral spirits, benzene, toluene, petroleum naphtha	Acid/alkaline wastes Toxic wastes Ignitable wastes Spent solvents
Rust Removal	Naval jelly, strong acids, strong alkalies	Phosphoric acid, hydrochloric acid, hydrofluoric acid, sodium hydroxide	Acid/alkaline wastes
Paint Preparation	Paint thinners, enamel reducers, white spirits, paint removers	Alcohols, petroleum distillates, oxygenated solvents, mineral spirits, ketones	Ignitable wastes Toxic wastes Paint wastes Spent solvents
Painting	Enamels, lacquers, epoxies, alkyds, acrylics, primers, solvents	Acetone, toluene, petroleum distillates, epoxy ester resins, methylene chloride, xylene, VM&P naphtha, aromatic hydrocarbons, methyl isobutyl, ketones	Ignitable wastes Toxic wastes Paint wastes Spent solvents
Spray Booth, Spray Guns, and Brush Cleaning	Paint thinners, enamel reducers, solvents, white spirits	Ketones, alcohols, toluene, acetone, isopropyl alcohol, petroleum distillates, mineral spirits	Ignitable wastes Toxic wastes Paint wastes
Paint Removal	Solvents, paint thinners, enamel reducers, white spirits	Acetone, toluene, petroleum distillates, methanol, methylene chloride, isopropyl alcohol, mineral spirits, alcohols, ketones, other oxygenated solvents	Paint wastes Spent solvents Toxic wastes

Table 2

Equipment Repair Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
STRONG ACID/ALKALINE WASTES				
Ammonium Hydroxide	Ammonium Hydroxide, NH_4OH, Spirit of Harnshorn, Aqua Ammonia	Waste Ammonium Hydroxide (containing not less than 12% but not more than 44% ammonia)	Corrosive Material	NA2672
		(containing less than 12% ammonia)	ORM-A	NA2672
Hydrobromic Acid	Hydrobromic Acid, HBr	Waste Hydrobromic Acid (not more than 49% strength)	Corrosive Material	UN1788
Hydrochloric Acid	Hydrochloric Acid, HCl, Muriatic Acid	Waste Hydrochloric Acid	Corrosive Material	NA1789
Hydrofluoric Acid	Hydrofluoric Acid, HF, Fluorohydric Acid	Waste Hydrofluoric Acid	Corrosive Material	UN1790
Nitric Acid	Nitric Acid, HNO_3, Aquafortis	Waste Nitric Acid (over 40%)	Oxidizer	UN2031
		(40% or less)	Corrosive Material	NA1760
Phosphoric Acid	Phosphoric Acid, H_3PO_4, Orthophosphoric Acid	Waste Phosphoric Acid	Corrosive Material	UN1805
Potassium Hydroxide	Potassium Hydroxide, KOH, Potassium Hydrate, Caustic Potash, Potassa	Waste Potassium Hydroxide Solution Dry Solid, Flake, Bead, or Granular	Corrosive Material Corrosive Material	UN1814 UN1813
Sodium Hydroxide	Sodium Hydroxide NaOH, Caustic Soda, Soda Lye, Sodium Hydrate	Waste Sodium Hydroxide Solution Dry Solid, Flake, Bead, or Granular	Corrosive Material Corrosive Material	UN1824 UN1823
Sulfuric Acid	Sulfuric Acid, H_2SO_4, Oil of Vitriol	Waste Sulfuric Acid	Corrosive Material	UN1832
Chromic Acid	Chromic Acid	Waste Chromic Acid Solution	Corrosive Material	UN1755
SPENT SOLVENTS AND IGNITABLE OR TOXIC WASTES CONTAINING:				
Ethylene Dichloride*	Ethylene Dichloride, 1,2-Dichloroethane	Waste Ethylene Dichloride	Flammable Liquid[2]	UN1184
Benzene*	Benzene	Waste Benzene (benzol)	Flammable Liquid	UN1114

Table 2 (continued)
Equipment Repair Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
Toluene	Toluene	Waste Toluene (tuluol)	Flammable Liquid	UN1294
Ethyl Benzene	Ethyl benzene	Waste Ethyl benzene	Flammable Liquid	UN1175
Chlorobenzene*	Chlorobenzene, Monochlorobenzene, Phenylchloride	Waste Chlorobenzene	Flammable Liquid	UN1134
Cresols*	o-Cresol, m-Cresol, p-Cresol, (m,p)-Cresol, (o,m,p)- Cresol	Waste Cresol	Corrosive Material	UN2076
Trichloroethylene*	TCE, Gemalgene, Lanadin, Lethurin, Nialk, Perm-a-Chlor	Waste Trichloroethylene	ORM-A	UN1710
Methyl Ethyl Ketone*	Methyl Ethyl Ketone, MEK, Methyl Acetone, Meetco, Butanone, Ethyl Methyl Ketone	Waste Methyl Ethyl Ketone	Flammable Liquid	UN1193
Chloroform*	Chloroform	Waste Chloroform	ORM-A	UN1888
Carbon Tetrachloride*	Perchloromethane Tetraform, Carbona Halon 104	Waste Carbon Tetrachloride	ORM-A	UN1846
Hexachloroethane*	Hexachloroethane	Waste Hexachloroethane	ORM-A	NA9037
White Spirits, Varsol	White Spirits, Mineral Spirits, Naphtha	Waste Naphtha	Flammable Liquid	UN2553
1,1,1-Trichloroethane	Aerothene TT, Chlorten, Chloroethane, Methyl Chloroform, Alpha T, Chlorotene	Waste 1,1,1-Trichloroethane	ORM-A	UN2831
Petroleum Distillates	Petroleum Distillates	Waste Petroleum Distillate	Flammable Liquid Combustible Liquid[3]	UN1268 UN1268
PAINT WASTES WITH HEAVY METALS				
Heavy Metal paints with: Lead* Nickel* Chromium*	Heavy Metal Paints	Hazardous Waste, Liquid or Solid, NOS[4]	ORM-E	NA9189
OTHER WASTES				
Used Oil	Various petroleum products	Waste Petroleum Oil, NOS Waste Petroleum Oil, NOS	Combustible Liquid Flammable Liquid	NA1270 NA1270
Ignitable Wastes, NOS	Ignitable Wastes	Waste Flammable Liquid, NOS Waste Combustible Liquid, NOS Waste Flammable Solid, NOS	Flammable Liquid Combustible Liquid Flammable Solid	UN1993 NA1993 UN1325
Hazardous Waste, NOS		Hazardous Waste, Liquid or Solid, NOS	ORM-E	UN9189

* Toxicity Characteristic constituent. Any waste that results in a leachate containing a Toxicity Characteristic constituent equal to or above regulatory levels is hazardous.

1 These descriptions may change given variations in waste characteristics or conditions. Note that the DOT shipping name, hazard class, and UN/NA ID number do not directly correspond to RCRA hazarous waste categories.

2 A flammable liquid has a flash point below 100°F.

3 A combustible liquid has a flash point between 100°F and 200°F.

4 NOS - Not otherwise specified.

Cleaning Agents and Cosmetics Manufacturers

Industry Overview

Not all businesses in the cleaning agents and cosmetic manufacturing category use hazardous substances. If, however, you use solvents, ignitable liquids, strong acids or bases, heavy metals, toxic organic constituents, or pesticides, you might generate hazardous waste. If you generate hazardous waste, you might be subject to the Resource Conservation and Recovery Act (RCRA) requirements covering the generation, transportation, and management of hazardous waste.

Your business is included in the *cleaning agents and cosmetics manufacturing* category if you formulate or manufacture:

- Soaps, detergents or specialty cleaners
- Polishing or sanitizing compounds
- Surfactants, finishing agents, or sulfonated oils and other assistants
- Perfumes
- Cosmetics
- Toilet preparations or sundries.

Hazardous Wastes from Cleaning Agents and Cosmetics Manufacturing

Manufacturers of cleaning agents and cosmetics use a wide range of processes and products, and many types of waste are generated. Table 1 summarizes the major hazardous waste types generated by manufacturers of cleaning agents and cosmetics, and Table 2 provides information about specific hazardous wastes. Generally, hazardous wastes from cleaning agents and chemical manufacturing are solvent wastes, pesticide wastes, acid/alkaline wastes, and heavy metal wastes. Wastewaters and sludges from cleaning equipment used in the formulation of soaps and stabilizers containing chromium and lead are listed hazardous wastes.

If you generate more than 100 kilograms (220 pounds or about one-half of a 55-gallon drum) of hazardous waste per month, you must complete a Uniform Hazardous Waste Manifest when shipping your waste. The Manifest requires the DOT (Department of Transportation) description of the waste, including the shipping name, hazard class, and UN/NA ID number. This information is provided in Table 2 for some wastes generated by manufacturers of cleaning agents and cosmetics. Table 1 and Table 2 are not comprehensive lists. If you suspect that you generate a hazardous waste that is not on this list, contact your state hazardous waste management agency or EPA Regional office for assistance.

Waste Minimization

An effective waste minimization program can reduce the costs, liabilities, and regulatory burdens of hazardous waste management, while potentially enhancing efficiency, product quality, and community relations. Waste minimization techniques that can help you reduce the amount of hazardous waste that you generate include:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Raw material substitution
- Loss prevention and housekeeping
- Waste segregation and separation
- Recycling.

Training and supervision of employees implementing waste minimization techniques is an important part of your successful program. Call the RCRA/Superfund Hotline toll-free at 800-424-9346 (or TDD 800-553-7672 for the hearing-impaired) for waste minimization information and publications.

Table 1
Typical Cleaning Agents and Cosmetics Manufacturing Operations: Materials Used and Hazardous Wastes that Might be Generated

Process/ Operation	Materials Used	General Types of Waste Generated
Cleaning Agent Manufacturing	Solvents, heavy metals, pesticides, organic chemicals, metals, strong acids and bases	Solvent wastes Toxic wastes Pesticide wastes Ignitable wastes Toxic heavy metal sludges and dusts Acid/alkaline wastes
Cosmetic Manufacturing	Solvents, organic chemicals, metals	Solvent wastes Toxic wastes Toxic heavy metal sludges

Table 2 (continued)

Cleaning Agents and Cosmetics Manufacturing Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
Methyl Ethyl Ketone*	Methyl Ethyl Ketone, MEK, Methyl Acetone, Butanone, Ethyl Methyl Ketone	Waste Methyl Ethyl Ketone	Flammable Liquid	UN1193
Cresols*	o-Cresol, m-Cresol, p-Cresol, (m,p)-Cresol, (o,m,p)-Cresol	Waste Cresol	Corrosive Material	UN2076
Phenol*	Phenol	Waste Phenol	Poison B	UN1671
HEAVY METAL DUSTS				
Heavy Metal Dusts	Heavy Metal Soaps containing: Silver, Calcium Chromate, Selenium, Barium, Cadmium, Mercury, Lead, Chromium, Nickel	Hazardous Waste, Solid or Liquid, NOS	ORM-E	NA9189
PESTICIDES CONTAINING ARSENIC				
Arsenic pentoxide	Arsenic (V) Oxide	Waste Arsenic Pentoxide, Solid	Poison B	UN1559
Arsenic trioxide	Arsenic (III) Oxide	Waste Arsenic Trioxide, Solid	Poison B	UN1561
Cacodylic acid	Hydroxydimethylarsine Oxide, Dimethylarsinic Acid, Phytar	Waste Arsenical Pesticide, Solid, NOS Waste Arsenical Pesticide, Liquid, NOS Waste Arsenical Pesticide, Liquid, NOS	Poison B Poison B Flammable Liquid	UN2759 UN2759 UN2760
Monosodium methanearsonate	MSMA, Arsanote Liquid, Herb-All, Weed-Hoe	Waste Arsenical Pesticide, Solid, NOS Waste Arsenical Pesticide, Liquid, NOS Waste Arsenical Pesticide, Liquid, NOS	Poison B Poison B Flammable Liquid	UN2759 UN2759 UN2760
Disodium monomethanearsonate	DSMA, Ansar 8100, DMA, Sodar	Waste Arsenical Pesticide, Solid, NOS Waste Arsenical Pesticide, Liquid, NOS Waste Arsenical Pesticide, Liquid, NOS	Poison B Poison B Flammable Liquid	UN2759 UN2759 UN2760
OTHER PESTICIDES				
Thiram	TMTD, Thiuramin, Vanacide TM	Waste Thiram Waste Flammable Liquid, Poisonous, NOS	ORM-A Flammable Liquid	NA2771 UN1992
Warfarin	Co-Rax, Kypfarin, Rax, Rodex	Hazardous Waste, Liquid or Solid, NOS Waste Flammable Liquid, NOS Waste Combustible Liquid, NOS	ORM-E Flammable Liquid Combustible Liquid	NA9189 UN1993 NA1993
Pentachlorophenol*	PCP, Pentachlor, Santophen	Waste Pentachlorophenol Waste Flammable Liquid, NOS Waste Combustible Liquid, NOS	ORM-E Flammable Liquid Combustible Liquid	NA2020 UN1993 NA1993
Pentachloronitrobenzene	PCNB, Earthcide, Folosan, Tritisan	Hazardous Waste, Liquid or Solid, NOS Waste Flammable Liquid, NOS Waste Combustible Liquid, NOS	ORM-E Flammable Liquid Combustible Liquid	NA9189 UN1993 NA1993
Hexachlorobenzene*	Perchlorobenzene, HCB, Anticarie, No Bunt	Hazardous Waste, Liquid or Solid, NOS Waste Flammable Liquid, NOS Waste Combustible Liquid, NOS	ORM-E Flammable Liquid Combustible Liquid	NA9189 UN1993 NA1993
1,2-Dibromo 3-chloropropane	DBCP, Nemafume, Nemanox, Nematocide	Hazardous Waste, Liquid or Solid, NOS Waste Flammable Liquid, NOS Waste Combustible Liquid, NOS	ORM-E Flammable Liquid Combustible Liquid	NA9189 UN1993 NA1993
PESTICIDES CONTAINING CARBAMATES				
Temik	Aldicarb, OMS 771, UC 21149	Waste Carbamate Pesticide, Solid, NOS Waste Carbamate Pesticide, Liquid, NOS Waste Carbamate Pesticide, Liquid, NOS	Poison B Poison B Flammable Liquid	UN2757 UN2757 UN2758
PESTICIDES CONTAINING MERCURY*				
2-Methoxyethylmercuric chloride	MEMC, Agallol, Cekusil Universal-C, Emisan 6	Waste Mercury Based Pesticide, Solid, NOS Waste Mercury Based Pesticide, Liquid, NOS Waste Mercury Based Pesticide, Liquid, NOS	Poison B Poison B Flammable Liquid	UN2777 UN2777 UN2778
Phenylmercuric acetate	PMA, PMAS, Agrosan, Celmer, Seedtox, Tag HL 331	Waste Mercury Based Pesticide, Solid, NOS Waste Mercury Based Pesticide, Liquid, NOS Waste Mercury Based Pesticide, Liquid, NOS	Poison B Poison B Flammable Liquid	UN2777 UN2777 UN2778

Table 2 (continued)
Cleaning Agents and Cosmetics Manufacturing Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
PESTICIDES CONTAINING SUBSTITUTED NITROPHENOLS				
Dinitrocresol	Dinitrocresol, DNC, DNOC, Sinox, Trifocide	Waste Substituted Nitrophenol Pesticide, Solid, NOS	Poison B	UN2779
		Waste Substituted Nitrophenol Pesticide, Liquid, NOS	Poison B	UN2779
		Waste Substituted Nitrophenol Pesticide, Liquid, NOS	Flammable Liquid	UN2780
Dinoseb	Dinoseb, DNBP, Basanite, Caldon, Dinitro General, Hel-Fire, Nitropone C.	Waste Substituted Nitrophenol Pesticide, Solid, NOS	Poison B	UN2779
		Waste Substituted Nitrophenol Pesticide, Liquid, NOS	Poison B	UN2779
		Waste Substituted Nitrophenol Pesticide, Liquid, NOS	Flammable Liquid	UN2780
ORGANOPHOSPHATE PESTICIDES				
Dimethoate	Dimethoate, Cygon, Daphene, De-Fend, Roxion, Trimetion	Waste Organophosphorous Pesticide, Solid, NOS	Poison B	UN2783
		Waste Organophosphorous Pesticide, Liquid, NOS	Poison B	UN2783
		Waste Organophosphorous Pesticide, Liquid, NOS	Flammable Liquid	UN2784
Disulfoton	Disulfoton, BAY 19639 and S276, Dithiodemeton.Ethylthiodemeton, M-74, Solvirex	Waste Disulfoton	Poison B	NA2783
		Waste Disulfoton Mixture, Dry	Poison B	NA2783
		Waste Disulfoton Mixture, Liquid	Poison B	NA2783
		Waste Organophosphorus Pesticide, Liquid, NOS	Flammable Liquid	UN2784
Famphur	Famphur, Famfos, Bash, Bo-Ana, Warbet	Waste Organophosphorus Pesticide, Solid, NOS	Poison B	UN2783
		Waste Organophosphorus Pesticide, Liquid, NOS	Poison B	UN2783
		Waste Organophosphorus Pesticide, Liquid, NOS	Flammable Liquid	UN2784
Methyl Parathion	Methyl Parathion, Cekumethion, E-601, Devithion, Metacide, Nitrox 80, Paratox, Wofatox	Waste Methyl Parathion, Liquid	Poison B	NA2783
		Waste Methyl Parathion Mixture, Dry	Poison B	NA2783
		Waste Methyl Parathion Mixture, Liquid (containing 25% or less methyl parathion)	Poison B	NA2783
		Waste Methyl Parathion Mixture, Liquid (containing more than 25% methyl parathion)	Poison B	NA2783
		Waste Organophosphorous Pesticide, Liquid, NOS	Flammable Liquid	UN2784
Parathion	Parathion, Ethyl Parathion, AC-3422, Alkron, Bladan, Etilon, Folidol E-605, Phoskil	Waste Parathion, Liquid	Poison B	NA2783
		Waste Parathion Mixture, Dry	Poison B	NA2783
		Waste Parathion Mixture, Liquid	Poison B	NA2783
		Waste Organophosphorous Pesticide, Liquid, NOS	Flammable Liquid	UN2784
STRYCHNINE PESTICIDES				
Strychnine	Strychnine Salts	Waste Strychnine, Solid	Poison B	UN1692
		Waste Strychnine, Solid	Poison B	UN1692
THALLIUM SULFATE PESTICIDES				
Thallium Sulfate	Thallous Sulfate, Rafox, Zelio	Waste Thallium Sulfate, Solid	Poison B	NA1707
		Waste Flammable Liquid, Poisonous, NOS	Flammable Liquid	UN1992
TRIAZINE PESTICIDES				
Amitrole	Amitrole, Amerol, Herbizole, Simazol, Weed 9701	Waste Triazine Pesticide, Solid, NOS	Poison B	UN2763
		Waste Triazine Pesticide, Liquid, NOS	Poison B	UN2763
		Waste Triazine Pesticide, Liquid, NOS	Flammable Liquid	UN2764
PHENOXY PESTICIDES				
2,4-D*	2,4-Dichlorophenoxyacetic Acid, Brush Killer, Crop Rider, Ded-Weed, Salvo, Weedone	Waste 2,4-Dichlorophenoxyacetic Acid	ORM-A	NA2765
		Waste 2,4-Dichlorophenoxyacetic Ester	ORM-E	NA2765
		Waste Phenoxy Pesticide, Liquid, NOS	Flammable Liquid	UN2766

Table 2 (continued)
Cleaning Agents and Cosmetics Manufacturing Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
2,4,5-T	2,4,5-Trichlorophenoxy Acetic Acid, Brush-Rap, Farmers Fence Rider, Weedone	Waste 2,4,5-Trichlorophenoxyacetic Acid	ORM-A	NA2765
		Waste 2,4,5-Trichlorophenoxyacetic Acid (amine, ester, or salt)	ORM-E	NA2765
		Waste Phenoxy Pesticide, Liquid, NOS	Flammable Liquid	UN2766
Silvex*	2,4,5-Fenoprop, Fruitone T, Kuron, Weed-B-Gone	Waste 2-(2,4,5-Trichlorophenoxy) propionic Acid	ORM-A	NA2765
		Waste 2-(2,4,5-Trichlorophenoxy) propionic Acid Ester	ORM-E	NA2765
		Waste Phenoxy Pesticide, Liquid, NOS	Flammable Liquid	UN2766
		Waste Phenoxy Pesticide, Liquid, NOS	Poison B	UN2765
ORGANOCHLORINE PESTICIDES				
Aldrin	HHDN, Aldrex 30, Altox, Drinox, Octalene, Seedrin Liquid	Waste Aldrin	Poison B	NA2761
		Waste Aldrin Mixture, Dry (with more than 65% Aldrin)	Poison B	NA2761
		Waste Aldrin Mixture, Dry (with 65% or less Aldrin)	ORM-A	NA2761
		Waste Organochlorine Pesticide, Liquid, NOS	Flammable Liquid	UN2762
Chlordane*	Chlorkil, Corodane, Octachlor	Waste Chlordane, Liquid	Flammable Liquid	NA2762
		Waste Chlordane, Liquid	Combustible Liquid	NA2762
DDT	DDT	Waste DDT	ORM-A	NA2761
Dichloropropene	1,3-Dichloropropene	Waste Dichloropropene	Flammable Liquid	UN2047
Dieldrin	Dieldrin, Dieldrex, Dieldrite	Waste Dieldrin	ORM-A	NA2761
Endrin*	Endrin, Endrex, Hexadrin	Waste Endrin, Liquid	Poison B	NA2761
		Waste Endrin Mixture	Poison B	NA2761
Endosulfan	Crisulfan, Malix	Waste Endosulfan	Poison B	NA2761
		Waste Endosulfan Mixture, Liquid	Poison B	NA2761
Heptachlor*	Gold Crest H-60, Drinox H-34, Heptamul, Heptox	Waste Heptachlor	ORM-E	NA2761
		Waste Organochlorine Pesticide, Liquid, NOS	Flammable Liquid	UN2762
Kepone	Chlordecone, GC 1189	Waste Kepone	ORM-E	NA2761
		Waste Organochlorine Pesticide, Liquid, NOS	Flammable Liquid	UN2762
Lindane*	Exgama, Forlin, Gallogama, Gamaphex, Gammex, Inexit, Isotox, Lindafor, Lindagam, Lindagrain, Lindagranox, Lindalo, Lindamul, Lindapourdre, Lindaterra, Novigam, Silvanol	Waste Lindane	ORM-A	NA2761
		Waste Organochlorine Pesticide, Liquid, NOS	Flammable Liquid	UN2762
Methoxychlor*	Flo Pro MeSeed Protectant, Marlate	Waste Methoxychlor	ORM-E	NA2761
		Waste Organochlorine Pesticide, Solid, NOS	Poison B	UN2701
		Waste Organochlorine Pesticide, Liquid, NOS	Poison B	UN2761
		Waste Organochlorine Pesticide, Liquid, NOS	Flammable Liquid	UN2762
Propylene Dichloride	1,2-Dichloropropane	Waste *Propylene Dichloride*	Flammable Liquid	UN1279
Toxaphene*	Attac 4-2, 4-4, 6, 6-3, 8, Camphochlor, Motox, Phenacide, Phenatox, Strobane T-90, Toxakil, Toxon 63	Waste Toxaphene	ORM-A	NA2761
		Waste Organochlorine Pesticide, Liquid, NOS	Flammable Liquid	UN2762
OTHER WASTES				
Ignitable Wastes, NOS		Waste Flammable Liquid, NOS	Flammable Liquid	UN1993
		Waste Flammable Solid, NOS	Flammable Solid	UN1325
		Waste Combustible Liquid, NOS	Combustible Liquid	NA1993
Hazardous Waste		Hazardous Waste, Liquid or Solid, NOS	ORM-E	UN9189

* Toxicity Characteristic constituent. Any waste that results in a TCLP extract containing a Toxicity Characteristic constituent equal to or above regulatory levels is hazardous.

1 These descriptions may change given variations in waste characteristics or conditions. Note that the DOT shipping name, hazard class, and UN/NA ID number do not directly correspond to RCRA hazardous waste categories.

2 NOS - Not otherwise specified.

3 A flammable liquid has a flash point below 100°F.

4 A combustible liquid has a flash point between 100°F and 200°F.

B 224323

Pesticide End-Users/Application Services

Industry Overview

Not all pesticide use generates hazardous waste. If, however, you dispose of pesticides or pesticide containers, clean pesticide application equipment, or contaminate soils with pesticides, you might be subject to Resource Conservation and Recovery Act (RCRA) requirements covering the generation, transportation, and management of hazardous waste. Farmers using pesticides are exempt from most RCRA provisions, including preparation of a Manifest, provided that pesticide containers are triple rinsed and the rinse solution is either used or disposed of on their own farms in accordance with the pesticide label instructions.

Several industries are included in the *pesticide end-users/application services* category:

- Agricultural pesticide application services
- Lawn, garden, and tree services
- Disinfecting and structural pest control services
- Arboreta, botanical, and zoological gardens and forestry operations
- Public golf courses and other facilities regularly using pesticides.

Hazardous Wastes Generated by Pesticide End-Users and Applications

Many pesticides are commonly used in applications ranging from protection of food and structures to pest and disease control in home gardens. Pesticides can be harmful if not mixed and disposed of in accordance with EPA-approved pesticide label instructions. Several types of wastes from pesticide end-users and applicators are common:

Rinsewater - Solutions used to rinse application equipment and product containers

Empty Containers - Containers that retain pesticide residues (unless triple rinsed)

Unused Pesticides - Unusable or unidentifiable material

Contaminated Soil - Soil or other material contaminated from spills.

Some very dilute rinsewater or soils contaminated with very low pesticide concentrations might not be hazardous, but should be treated as hazardous waste unless known to be nonhazardous from label information, chemical analysis, or another reliable source. Pesticide containers that are triple rinsed are not hazardous waste, although the rinse solution might be hazardous. Some pesticide formulations contain solvents or other material that make the pesticide solution an ignitable or toxic hazardous waste.

Table 1 summarizes possible waste types from pesticide application. If you generate more than 100 kilograms (220 pounds or about half of a 55-gallon drum) of hazardous waste per month, you must complete a Uniform Hazardous Waste Manifest when shipping your wastes. The Manifest requires the DOT (Department of Transportation) description of the waste including shipping name, hazard class, and UN/NA ID number. This information can be found in Table 2 for some wastes associated with pesticide use.

To assess whether RCRA requirements are applicable, the entire weight of each waste (e.g., the weight of any contaminated soil), not just the weight of the pesticide, is considered. Regardless of the quantity generated, pesticide waste should be disposed of according to EPA-approved pesticide container label instructions. Table 1 and Table 2 are not comprehensive lists. If you suspect that you generate a hazardous waste that is not listed, contact your state hazardous waste management agency or EPA Regional office for assistance.

Waste Minimization

An effective waste minimization program can reduce the costs, liabilities, and regulatory burdens of hazardous waste management, while potentially enhancing efficiency, product quality, and community relations. Waste minimization techniques that can help you reduce the amount of hazardous waste that you generate include:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Raw material substitution
- Loss prevention and housekeeping
- Waste segregation and separation
- Recycling.

Training and supervision of employees implementing waste minimization techniques is an important part of your successful program. Call the RCRA/Superfund Hotline toll-free at 800-424-9346 (or TDD 800-553-7672 for the hearing-impaired) for waste minimization information and publications.

EPA/530-SW-90-027i

Table 1

Typical Pesticide End Users/Application Services Operations: Materials Used and Hazardous Wastes that Might be Generated

Process/ Operation	Materials Used	Typical Material Ingredient	General Types of Waste Generated
Pesticide Application	Pesticides, solvents	Arsenic, carbamates, mercury, nicotine, nitrophenols, strychnine, triazine, thallium sulfate, phenoxy, organochlorides, others (see Table 2)	Used/unused pesticides Solvent wastes Ignitable wastes Contaminated soil (from spills)
Cleanup	Rinses, solvents, rags	Alcohols, toluene, benzene, xylene, solvent mixtures	Contaminated rinsewater Empty containers Solvent wastes

Table 2

Pesticide End-Users/Application Services Formulators Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
PESTICIDES CONTAINING ARSENIC*				
Arsenic pentoxide	Arsenic Acid Anhydrice, Arsenic (v) Oxide	Waste Arsenic Pentoxide, Solid	Poison B	UN1559
Arsenic trioxide	Arsenic Sesquioxide, Arsenic (III) Oxide, Arsenous Acid (anhydride), White Arsenic	Waste Arsenic Trioxide, Solid	Poison B	UN1561
Cacodylic acid	Hydroxydimethylarsine Oxide, Dimethylarsinic Acid, Phytar	Waste Arsenical Pesticide, Solid, NOS[2] Waste Arsenical Pesticide, Liquid, NOS Waste Arsenical Pesticide, Liquid, NOS	Poison B Poison B Flammable Liquid[3]	UN2759 UN2759 UN2760
Monosodium methanearsonate	MSMA, Ansar 170 H.C. and 529 H.C., Arsanote Liquid, Bueno 6, Daconate 6, Dal-E-Rad, Herb-All, Merge 823, Mesamate, Monate, Tans-Vert, Weed-E-Rad, Weed-Hoe	Waste Arsenical Pesticide, Solid, NOS Waste Arsenical Pesticide, Liquid, NOS Waste Arsenical Pesticide, Liquid, NOS	Poison B Poison B Flammable Liquid	UN2759 UN2759 UN2760
Disodium monomethanearsonate	DSMA, Ansar 8100, Arrhenal, Arsinyl, Dinate, Di-Tac, DMA, Methar 30, Sodar, Versar DSMA-LQ, Weed-E-Rad 360	Waste Arsenical Pesticide, Solid, NOS Waste Arsenical Pesticide, Liquid, NOS Waste Arsenical Pesticide, Liquid, NOS	Poison B Poison B Flammable Liquid	UN2759 UN2759 UN2760
PESTICIDES CONTAINING CARBAMATES				
Temik	Aldicarb, OMS 771, UC 21149	Waste Carbamate Pesticide, Solid, NOS Waste Carbamate Pesticide, Liquid, NOS Waste Carbamate Pesticide, Liquid, NOS	Poison B Poison B Flammable Liquid	UN2757 UN2757 UN2758
PESTICIDES CONTAINING MERCURY*				
2-Methoxyethylmercuric chloride	MEMC, Agallol, Cekusil Universal-C, Ceresan-Universal-Nassbeize, Emisan 6	Waste Mercury Based Pesticide, Solid, NOS Waste Mercury Based Pesticide, Liquid, NOS Waste Mercury Based Pesticide, Liquid, NOS	Poison B Poison B Flammable Liquid	UN2777 UN2777 UN2778
Phenylmercuric acetate	PMA, PMAS, Agrosan, Cekusil, Celmer, Gallotox, Hong Nien, Liquiphene, Mersolite, Pamisan, Phix, Seedtox, Shimmer-ex, Tag HL 331	Waste Mercury Based Pesticide, Solid, NOS Waste Mercury Based Pesticide, Liquid, NOS Waste Mercury Based Pesticide, Liquid, NOS	Poison B Poison B Flammable Liquid	UN2777 UN2777 UN2778
PESTICIDES CONTAINING NICOTINE				
Nicotine	Black Leaf 40	Waste Poison B, Solid, NOS Waste Poison B, Liquid, NOS Waste Flammable Liquid, Poisonous, NOS	Poison B Poison B Flammable Liquid	UN2811 UN2810 UN1992
PESTICIDES CONTAINING SUBSTITUTED NITROPHENOLS				
Dinitrocresol	DNC, DNOC, Chemsect, Detal, Elgetol 30, Nitador, Selinin, Sinox, Trifocide, Trifrina	Waste Substituted Nitrophenol Pesticide, Solid, NOS Waste Substituted Nitrophenol Pesticide, Liquid, NOS Waste Substituted Nitrophenol Pesticide, Liquid, NOS	Poison B Poison B Flammable Liquid	UN2779 UN2779 UN2780

Table 2 (continued)

Pesticide End-Users/Application Services Formulators Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
Dinoseb	DNBP, Basanite, Caldon, Chemox General, Chemox PE, Dinitro, Dinitro General, Dynamite, Elgetol 318, Gebutox, Hel-Fire, Nitropone C, Premerge 3, Sinox General, Subitex, Vertac General Weed Killer, Vertac Selective Weed Killer	Waste Substituted Nitrophenol Pesticide, Solid, NOS	Flammable Liquid	UN2780
		Waste Substituted Nitrophenol Pesticide, Liquid, NOS		
		Waste Substituted Nitrophenol Pesticide, Liquid, NOS		
ORGANOPHOSPHATE PESTICIDES				
Dimethoate	AC-12880, Bi 58 EC, Cekuthoate, Cygon, Daphene, De-Fend, Demos-L40, Devigon, Dimet, Dimethogen, Perfekthion, Rebelate, Rogodial, Rogor, Roxion, Trimetion	Waste Organophosphorus Pesticide, Solid, NOS	Poison B	UN2783
		Waste Organophosphorus Pesticide, Liquid, NOS	Poison B	UN2783
		Waste Organophosphorus Pesticide, Liquid, NOS	Flammable Liquid	UN2784
Disulfoton	BAY 19639 and S276, Dithiodemeton, Dithiosystox, Di-Syston, Ethylthiodemeton, Frumin AL, M-74, Solvirex, Thiodemeton	Waste Disulfoton	Poison B	NA2783
		Waste Disulfoton Mixture, Dry	Poison B	NA2783
		Waste Disulfoton Mixture, Liquid	Poison B	NA2783
		Waste Organophosphorus Pesticide, Liquid, NOS	Flammable Liquid	UN2784
Famphur	Bash, Bo-Ana, Dovip, Famfos, Warbex	Waste Organophosphorus Pesticide, Solid, NOS	Poison B	UN2783
		Waste Organophosphorus Pesticide, Liquid, NOS	Poison B	UN2783
		Waste Organophosphorus Pesticide, Liquid, NOS	Flammable Liquid	UN2784
Methyl Parathion	Cekumethion, E-601, Devithion, Folidol M, Fosferno M50, Gearphos, Metacide, Metaphos, Nitrox 80, Parataf, Paratox, Partron M, Penncap-M, Wofatox	Waste Methyl Parathion, Liquid	Poison B	NA2783
		Waste Methyl Parathion Mixture, Dry	Poison B	NA2783
		Waste Methyl Parathion Mixture, Liquid (containing 25% or less methyl parathion)	Poison B	NA2783
		Waste Methyl Parathion Mixture, Liquid (containing more than 25% methyl parathion)	Poison B	NA2783
		Waste Organophosphorus Pesticide, Liquid, NOS	Flammable Liquid	UN2784
Parathion	AC-3422, Alkron, Alleron, Aphamite, Bladan, Corothion, E-605, ENT 15108, Ethyl Parathion, Etilon, Folidol E-605, Fosferno 50, Niran, Orthophos, Panthion, Paramar, Paraphos, Parathene, Parawet, Phoskil, Rhodiatox, Soprathion, Station, Thiophos	Waste Parathion, Liquid	Poison B	NA2783
		Waste Parathion Mixture, Dry	Poison B	NA2783
		Waste Parathion Mixture, Liquid	Poison B	NA2783
		Waste Organophosphorus Pesticide, Liquid, NOS	Flammable Liquid	UN2784
STRYCHNINE PESTICIDES				
Strychnine	Strychnine Salts	Waste Strychnine, Solid	Poison B	UN1692
		Waste Strychnine Salt, Solid	Poison B	UN1692
THALLIUM SULFATE PESTICIDES				
Thallium Sulfate	Thallous Sulfate, Ratox, Zelio	Waste Thallium Sulfate, Solid	Poison B	NA1707
		Waste Flammable Liquid, Poisonous, NOS	Flammable Liquid	UN1992
TRIAZINE PESTICIDES				
Amitrole	Amerol, Amino Triazol Weedkiller 90, Amizol, AT-90, AT Liquid, Azolan, Azole, Cytrol, Diurol, Farmco, Herbizole, Simazol, Weedazol, Weedazol TL	Waste Triazine Pesticide, Solid, NOS	Poison B	UN2763
		Waste Triazine Pesticide, Liquid, NOS	Poison B	UN2763
		Waste Triazine Pesticide, Liquid, NOS	Flammable Liquid	UN2764
PHENOXY PESTICIDES				
2,4-D*	Amoxone, Brush Killer, Brush Rhap, Chloroxone, Crop Rider, D50, DMA 4, Dacamine, Ded-Weed, Desormone, Dinoxol, Emulsamine BK and E3, Envert DT and 171, Hedonal, Miracle, Pennamine D, Rhodia, Salvo, Super D-Weedone, Verton, Visko-Rhap, Weed Tox, Wee-B-Gone, Weed-Rhap, Weedar, Weedone, Weedurol	Waste 2,4-Dichlorophenoxyacetic Acid	ORM-A	NA2765
		Waste 2,4-Dichlorophenoxyacetic Ester	ORM-E	NA2765
		Waste Phenoxy Pesticide, Liquid, NOS	Flammable Liquid	UN2766
2,4,5-T	Brush-Rhap, Dacamine, Ded-Weedon, Esteron, Farmco Fence Rider, Forron, Inverton 245, Line Rider, Super D Weedone, Tormona, Transamine, U 46, Veon 245, Weedar, Weedone	Waste 2,4,5-Trichlorophenoxyacetic Acid	ORM-A	NA2765
		Waste 2,4,5-Trichlorophenoxyacetic Acid (amine, ester, or salt)	ORM-E	NA2765
		Waste Phenoxy Pesticide, Liquid, NOS	Flammable Liquid	UN2766

Table 2 (continued)

Pesticide End-Users/Application Services Formulators Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
Silvex*	2,4,5-Fenoprop, AquaVex, Double Strength, Fruitone T, Kuron, Kurosal, Silvi-Rhap, Weed-B-Gone	Waste 2-(2,4,5-Trichlorophenoxy) propionic Acid	ORM-A	NA2765
		Waste 2-(2,4,5-Trichlorophenoxy) propionic Acid Ester	ORM-E	NA2765
		Waste Phenoxy Pesticide, Liquid, NOS	Flammable Liquid	UN2766
ORGANOCHLORINE PESTICIDES				
Aldrin	HHDN, Aldrex 30, Aldrite, Aldrosol, Altox, Drinox, Octalene, Seedrin Liquid	Waste Aldrin	Poison B	NA2761
		Waste Aldrin Mixture, Dry (with more than 65% Aldrin)	Poison B	NA2761
		Waste Aldrin Mixture, Dry (with 65% or less Aldrin)	ORM-A	NA2761
		Waste Aldrin Mixture, Liquid (with more than 60% Aldrin)	Poison B	NA2762
		Waste Aldrin Mixture, Liquid (with 60% or less Aldrin)	ORM-A	NA2762
		Waste Organochlorine Pesticide, Liquid, NOS	Flammable Liquid	UN2762
Chlordane*	Belt, Chlordan, ChlorKil, Chlortox, Corodane, Gold Crest C-100, Kypchlor, Vesicol 1068, Topiclor 20, Nitan, Octachlor, Octa-Klor, Orthio-Klor, Synklor, Termi-Ded	Waste Chlordane, Liquid	Flammable Liquid	NA2762
		Waste Chlordane, Liquid	Combustible Liquid[4]	NA2762
DDT	Dedelo, Didimic, Digmar, Genitox, Gyron, Hildit, Kopsol, Neocid, Pentachlorin, Rukseam, Zerdane	Waste DDT	ORM-A	NA2761
		Waste Organochlorine Pesticide, Liquid, NOS	Flammable Liquid	UN2762
Dichloropropene	1,3-Dichloropropene, Telone II Soil Fumigant	Waste Dichloropropene	Flammable Liquid	UN2047
Dieldrin	Dieldrex, Dieldrite, Octalox, Panoram D-31	Waste Dieldrin	ORM-A	NA2761
		Waste Organochloride Pesticide, Liquid, NOS	Flammable Liquid	UN2762
Endrin*	Endrex, Hexadrin	Waste Endrin	Poison B	NA2761
		Waste Endrin Mixture, Liquid	Poison B	NA2761
		Waste Organochlorine Pesticide, Liquid, NOS	Flammable Liquid	UN2762
Endosulfan	Beosit, Chlorthiepin, Crisulfan, Cyclodan, Endocel, EnSure, FMC 5462, Hildan, Hoe 2671, Malix, Thifor, Thimul, Thiodan, Thiofor, Thionex, Thiovel	Waste Endosulfan	Poison B	NA2761
		Waste Endosulfan Mixture, Liquid	Poison B	NA2761
		Waste Organochlorine Pesticide, Liquid, NOS	Flammable Liquid	UN2762
Heptachlor*	Gold Crest H-60, Drinox H-34, Heptamul, Heptox	Waste Heptachlor	ORM-E	NA2761
		Waste Organochlorine Pesticide, Liquid, NOS	Flammable Liquid	UN2762
Kepone	Chlordecone, GC 1189	Waste Kepone	ORM-E	NA2761
		Waste Organochlorine Pesticide, Liquid, NOS	Flammable Liquid	UN2762
Lindane*	Exgama, Forlin, Gallogama, Gamaphex, Gammex, Inexit, Isotox, Lindafor, Lindagam, Lindagrain, Lindagranox, Lindalo, Lindamul, Lindapourdre, Lindaterra, Novigam, Silvanol	Waste Lindane	ORM-A	NA2761
		Waste Organochlorine Pesticide, Liquid, NOS	Flammable Liquid	UN2762
Methoxychlor	Flo Pro MeSeed Protectant, Marlate	Waste Methoxychlor	ORM-E	NA2761
		Waste Organochlorine Pesticide, Solid, NOS	Poison B	UN2701
		Waste Organochlorine Pesticide, Liquid, NOS	Poison B	UN2761
		Waste Organochlorine Pesticide, Liquid, NOS	Flammable Liquid	UN2762
Propylene Dichloride	1,2-Dichloropropane	Waste Propylene Dichloride	Flammable Liquid	UN1279
Toxaphene*	Attac 4-2, 4-4, 6, 6-3, 8, Camphochlor, Motox, Phenacide, Phenatox, Strobane T-90, Toxakil, Toxon 63	Waste Toxaphene	ORM-A	NA2761
		Waste Organochlorine Pesticide, Liquid, NOS	Flammable Liquid	UN2762

Table 2 (continued)

Pesticide End-Users/Application Services Formulators Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
OTHER PESTICIDES				
Thiram	TMTD, AAtack, Arasan, Aules, Evershield T Seed Protectant, Fermide 850, Fernasan, Flo Pro T Seed Protectant, Hexathir, Mercuram, Nomersan, Pomarsolforte, Polyram-Ultra, Spotrete-F, Tetrapom, Thimer, Thioknock, Thiotex, Thiramad, Thirasan, Thiuramin, Tirampa, Trametan, Tripomol, Thylate, Tuads, Vancide TM	Waste Thiram Waste Flammable Liquid, Poisonous, NOS	ORM-A Flammable Liquid	NA2771 UN1992
Warfarin	Co-Rax, Cov-R-Tox, Kypfarin, Liqua-Tox, RAX, Rodex, Rodex Blox, Tox-Hid	Hazardous Waste, Solid NOS Hazardous Waste, Liquid, NOS Waste Flammable Liquid, NOS Waste Combustible Liquid, NOS	ORM-E ORM-E Flammable Liquid Combustible Liquid	NA9189 NA9189 UN1993 NA1993
Pentachlorophenol*	PCP, Penta, Penchlorol, Pentacon, Penwar, Sinituho, Santophen	Waste Pentachlorophenol Waste Flammable Liquid Waste Combustible Liquid	ORM-E Flammable Liquid Combustible Liquid	NA2020 UN1993 NA1993
Pentachloronitrobenzene	PCNB, Avicol, Botrilex, Brassicol, Earthcide, Folosan, Kobu, Pentagen, Saniclor 30, Terraclor, Tilcarex, Tritisan	Hazardous Waste, Solid, NOS Hazardous Waste, Liquid, NOS Waste Flammable Liquid, NOS Waste Combustible Liquid, NOS	ORM-E ORM-E Flammable Liquid Combustible Liquid	NA9189 NA9189 UN1993 NA1993
Hexachlorobenzene*	Perchlorobenzene, Anticarie, Ceku C.B., HCB, No Bunt	Hazardous Waste, Solid NOS Hazardous Waste, Liquid, NOS Waste Flammable Liquid, NOS Waste Combustible Liquid, NOS	ORM-E ORM-E Flammable Liquid Combustible Liquid	NA9189 NA9189 UN1993 NA1993
1,2-Dibromo 3-chloropropane	DBCP, Nemafume, Nemanox, Nemaset, Nematocide	Hazardous Waste, Solid, NOS Hazardous Waste, Liquid, NOS Waste Flammable Liquid, NOS Waste Combustible Liquid, NOS	ORM-E ORM-E Flammable Liquid Combustible Liquid	NA9189 NA9189 UN1993 NA1993
IGNITABLE AND/OR TOXIC SOLVENTS USED IN PESTICIDES				
Methyl Alcohol	Methanol	Waste Methyl Alcohol	Flammable Liquid	UN1230
Ethyl Alcohol	Ethanol, Alcohol	Waste Ethyl Alcohol	Flammable Liquid	UN1170
Isopropyl Alcohol	Isopropanol	Waste Isopropanol	Flammable Liquid	UN1219
Toluene	Methyl benzene, Toluol	Waste Toluene, (toluol)	Flammable Liquid	UN1294
Xylene	Dimethylbenzene, Xylol	Waste Xylene (xylol)	Flammable Liquid	UN1307
Chloroform*	Chloroform	Waste Chloroform	ORM-A	UN1888
Carbon Tetrachloride*	Perchloromethane, Tetraform, Carbona Halon 104	Waste Carbon Tetrachloride	ORM-A	UN1846
Benzene*	Benzol	Waste Benzene (Benzol)	Flammable Liquid	UN1114
Tetrachloroethylene*	Perc, Perclene, Tetralex, Nema, Tetracap, Persec, Antisal 1, Perawin, Didakene	Waste Tetrachloroethylene	ORM-A	UN1897
Solvent Mixtures		Waste Combustible Liquid, NOS (flash point between 100°F and 200°F) Waste Flammable Liquid, NOS (flash point less than 100°F)	Combustible Liquid Flammable Liquid	NA1993 UN1993

Table 2 (continued)

Pesticide End-Users/Application Services Formulators Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
OTHER WASTES				
Ignitable Wastes, NOS		Waste Flammable Liquid, NOS	Flammable Liquid	UN1993
		Waste Flammable Solid, NOS	Flammable Solid	UN1325
		Waste Combustible Liquid, NOS	Combustible Solid	NA1993
Hazardous Waste		Hazardous Waste, Liquid or Solid, NOS	ORM-E	UN9189

* Toxicity Characteristic constituent. Any waste that results in a TCLP extract containing a Toxicity Characteristic constituent equal to or above regulatory levels is hazardous.

1 These descriptions may change given variations in waste characteristics or conditions. Note that the DOT shipping name, hazard class, and UN/NA ID number do not directly correspond to RCRA hazardous waste categories.

2 NOS—Not otherwise specified.

3 A flammable liquid has a flash point below 100°F.

4 A combustible liquid has a flash point between 100°F and 200°F.

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Formulators

Industry Overview

If your operation is in the chemical formulating industry category and you use solvents, pesticides, strong acids or bases, ignitable chemicals, reactive chemicals, or solutions or sludges containing metals or toxic organic chemicals, you might be subject to Resource Conservation and Recovery Act (RCRA) requirements covering the generation, transportation, and management of hazardous waste.

The following *chemical formulating industry* groups are covered by this summary:

- Printing ink
- Pesticides and agricultural chemicals
- Pharmaceutical preparations
- Paint and coatings
- Chemical product formulation not elsewhere classified under chemical manufacturing.

Hazardous Wastes From Formulators

While the specific chemical constituents of your waste can vary depending on the type of chemicals you formulate, most formulators will have wastes that fall under one of the following categories:

Spent or unusable materials such as chemicals and solvents

Rinsing solutions from cleaning of containers, mixing vats, and tools

Rags and other cleaning implements.

In addition, specific formulators generate wastes such as used pesticide and pesticide containers, spent catalysts, wastes containing heavy metals, ink wastes, ignitable wastes, and reactive wastes.

Printing ink formulation involves the combination of basic constituents in proportions that depend on the desired properties of the ink. In general, inks are made from coloring materials that can include flushed colors, color concentrates, toners, and pigments; resins and varnishes; and solvents. Pigments might contain heavy metals or other toxic constituents. Resins and varnishes might contain toxic organic constituents. Many spent solvents are listed wastes. In addition to these basic ingredients, other ingredients that contain hazardous materials are sometimes added to adjust the ink's properties. These include driers, waxes, antioxidants, thickeners and gellants, defoamers, wetting agents, and surfactants. The main categories of wastes generated from the formulation of printing ink include alkaline wastes, spent solvents and solvent still bottoms, heavy metal solutions, ink sludges containing chromium or lead, and other wastes that might contain toxic organic constituents.

Pesticide and agricultural chemical formulators mix concentrated pesticides with carriers and dispersing agents for use by pesticide applicators. The formulations can include a number of compounds that enhance the properties of the pesticide product. The carriers, dispersing agents, and other compounds might contain hazardous constituents. In general, the wastes from pesticide and agricultural formulators are pesticide-contaminated rinse solutions generated from washing and rinsing the drums, vats, and assorted instruments used to mix the formulation.

Formulators of **pharmaceutical preparations** generate spent solvents and solvent still bottoms, ignitable wastes, and possibly toxic wastewaters and sludges. The formulation of **paints and coatings** (e.g., varnishes, lacquers, enamels) usually involves the use of solvents, driers, plastic resins, alcohols, phthalates, and inorganic pigments. Potentially hazardous wastes from the formulation of paints and coatings are solvent wastes, sludges, cleaning wastes, spills, and spoiled batches. Formulators of **other miscellaneous chemical products** often generate hazardous wastes including strong acid/alkaline wastes, spent solvents and still bottoms, reactive wastes, ignitable wastes, and toxic wastes.

Table 1 summarizes some of the general waste types generated during formulation. If you generate more than 100 kilograms (220 pounds or one-half of a 55-gallon drum) of hazardous waste per month, you must complete a Uniform Hazardous Waste Manifest when you ship your waste off your property. The Manifest requires the DOT (Department of Transportation) description of the waste including shipping name, hazard class, and UN/NA ID number. This information is present in Tables 2 through 5 for some wastes generated by formulators. These tables are not comprehensive lists. If you suspect that you generate a hazardous waste that is not on this list, contact your state hazardous waste management agency or EPA Regional office for assistance.

Waste Minimization

An effective waste minimization program can reduce the costs, liabilities, and regulatory burdens of hazardous waste management, while potentially enhancing efficiency, product quality, and community relations. Waste minimization techniques that can help you reduce the amount of hazardous waste that you generate include:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Raw material substitution
- Loss prevention and housekeeping
- Waste segregation and separation
- Recycling.

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Training and supervision of employees implementing waste minimization techniques is an important part of your successful program. Call the RCRA/Superfund Hotline toll-free at 800-424-9346 (or TDD 800-553-7672 for the hearing-impaired) for waste minimization information and publications.

EPA/530-SW-90-027p

Table 1

Typical Formulators Operations: Materials Used and Hazardous Wastes that Might be Generated

Process/ Operation	Materials Used	General Types of Waste Generated
Printing Ink Formulation	Coloring materials, resins, varnishes, solvents, driers, antioxidants, thickeners, gellants, waxes, defoamers, wetting agents, surfactants	Acid/alkaline wastes Toxic heavy metal wastes (dust and sludge) Ink — sludges with chromium or lead Solvent wastes Other toxic wastes
Pesticide and Agricultural Chemical Formulation	Pesticides, solvents, organic chemicals, heavy metals	Pesticide wastes Empty containers Rinsewater Solvent wastes Toxic wastes
Pharmaceutical Preparations Formulation	Solvents, resins, lubricants, gelatins	Solvent wastes Ignitable wastes Toxic wastewaters and wastewater treatment sludges
Paint and Coatings Formulation	Paints, solvents, heavy metals, acids/alkalies, driers, plastic resins, plasticizers	Acid/alkaline wastes Toxic heavy metal wastes (dust and sludge) Other toxic wastes Paint wastes Solvent wastes Spoiled batches
Chemical Product Formulation not Classified Elsewhere	Solvents, chemicals, catalysts, acids/alkalies, heavy metals	Acid/alkaline wastes Toxic heavy metal wastes (dust and sludge) Other toxic wastes Ignitable wastes Reactive wastes Solvent wastes Spent catalysts Emission control dusts and sludges

Table 2

Printing Ink Formulators Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
STRONG ALKALINE WASTES				
Ammonium Hydroxide	Ammonium Hydroxide, NH_4OH, Spirit of Hartshorn, Aqua Ammonia	Waste Ammonium Hydroxide (containing not less than 12% but not more than 44% ammonia)	Corrosive Material	NA2672
		(containing less than 12% ammonia	ORM-A	NA2672
SPENT SOLVENTS, SOLVENT STILL BOTTOMS, AND IGNITABLE TOXIC WASTES CONTAINING:				
Benzene*	Benzene	Waste Benzene (Benzol)	Flammable Liquid[2]	UN1114
Acetone	Acetone	Waste Acetone	Flammable Liquid	UN1090
Toluene	Toluene, Methacide, Methylbenzene, Methylbenzol, Phenylmethane, Toluol, Antisal 1A	Waste Toluene (Toluol)	Flammable Liquid	UN1294
Methyl Ethyl Ketone*	Methyl acetone, Meetco, Butanone, MEK, 2-butanone	Waste Methyl Ethyl Ketone	Flammable Liquid	UN1193
Xylene	Xylene, Xylol	Waste Xylene (Xylol)	Flammable Liquid	UN1307
Ethyl Acetate	Ethyl Acetate	Waste Ethyl Acetate	Flammable Liquid	UN1173
n-Butyl Acetate	Butyl Acetate	Waste n-Butyl Acetate	Flammable Liquid	UN1123
Isopropyl Acetate	Isopropyl Acetate	Waste Isopropyl Acetate	Flammable Liquid	UN1220

Table 2 (continued)
Printing Ink Formulators Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
Glycol Ethers	May include numerous compounds including diethylene glycol and hexylene glycol	Waste Combustible Liquid, NOS[3]	Combustible Liquid[4]	NA1993
Ethyl Alcohol	Ethanol	Waste Ethyl Alcohol	Flammable Liquid	NA1170
Isopropyl Alcohol	Isopropanol	Waste Isopropanol	Flammable Liquid	UN1219
Propyl Alcohol	Propanol	Waste Propyl Alcohol	Flammable Liquid	UN1274
Hexane	Hexane	Waste Hexane	Flammable Liquid	UN1208
Heptane	Heptane	Waste Heptane	Flammable Liquid	UN1206
Naphtha	Mineral Spirits, VM&P Naphtha, White Spirits	Waste Naphtha	Combustible Liquid	UN2553
Chlorobenzene*	Chlorobenzene, Monochlorobenzene, Phenylchloride	Waste Chlorobenzene	Flammable Liquid	UN1134
Chloroform*	Chloroform	Waste Chloroform	ORM-A	UN1888
Cresols*	o-Cresol, m-Cresol, p-Cresol, (m,p)-Cresol, (o,m,p)-Cresol	Waste Cresol	Corrosive Material	UN2076
HEAVY METAL SOLUTIONS				
Heavy Metal Solutions	Aqueous washing solutions from ink formulation, ink tub washwater	Hazardous Waste, Liquid, NOS	ORM-E	NA9189
INK SLUDGE				
Ink Sludge Containing Chromium or Lead	Organic Heavy Metal Sludges	Hazardous Waste, Liquid, NOS	ORM-E	NA9189
OTHER WASTES				
Ignitable Wastes, NOS		Waste Flammable Liquid, NOS Waste Flammable Solid, NOS Waste Combustible Liquid, NOS	Flammable Liquid Flammable Solid Combustible Liquid	UN1993 UN1325 NA1993
Hazardous Waste		Hazardous Waste, Liquid or Solid, NOS	ORM-E	UN9189

* Toxicity Characteristic constituent. Any waste that results in a TCLP extract containing a Toxicity Characteristic constituent equal to or above regulatory levels is hazardous.

1 These descriptions may change given variations in waste characteristics or conditions. Note that the DOT shipping name, hazard class, and UN/NA ID number do not directly correspond to RCRA categories of hazardous waste.

2 A flammable liquid has a flash point below 100°F.

3 NOS - Not otherwise specified.

4 A combustible liquid has a flash point between 100°F and 200°F.

Table 3
Pesticide and Agricultural Chemical Formulators Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
PESTICIDES CONTAINING ARSENIC*				
Arsenic pentoxide	Arsenic Acid Anhydrice, Arsenic (v) Oxide	Waste Arsenic Pentoxide, Solid	Poison B	UN1559
Arsenic trioxide	Arsenic Sesquioxide, Arsenic (III) Oxide, Arsenous Acid (anhydride), White Arsenic	Waste Arsenic Trioxide, Solid	Poison B	UN1561
Cacodylic acid	Hydroxydimethylarsine Oxide, Dimethylarsinic Acid, Phytar	Waste Arsenical Pesticide, Solid, NOS[2] Waste Arsenical Pesticide, Liquid, NOS Waste Arsenical Pesticide, Liquid, NOS	Poison B Poison B Flammable Liquid[3]	UN2759 UN2759 UN2760
Monosodium methanearsonate	MSMA, Ansar 170 H.C. and 529 H.C., Arsanote Liquid, Bueno 6, Daconate 6, Dal-E-Rad, Herb-All, Merge 823, Mesamate, Monate, Tans-Vert, Weed-E-Rad, Weed-Hoe	Waste Arsenical Pesticide, Solid, NOS Waste Arsenical Pesticide, Liquid, NOS Waste Arsenical Pesticide, Liquid, NOS	Poison B Poison B Flammable Liquid	UN2759 UN2759 UN2760

Table 3 (continued)

Pesticide and Agricultural Chemical Formulators Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
Disodium monomethanearsonate	DSMA, Ansar 8100, Arrhenal, Arsinyl, Dinate, Di-Tac, DMA, Methar 30, Sodar, Versar DSMA-LQ, Weed-E-RAD 360	Waste Arsenical Pesticide, Solid, NOS	Poison B	UN2759
		Waste Arsenical Pesticide, Liquid, NOS	Poison B	UN2759
		Waste Arsenical Pesticide, Liquid, NOS	Flammable Liquid	UN2760
PESTICIDES CONTAINING CARBAMATES				
Temik	Aldicarb, OMS 771, UC 21149	Waste Carbamate Pesticide, Solid, NOS	Poison B	UN2757
		Waste Carbamate Pesticide, Liquid, NOS	Poison B	UN2757
		Waste Carbamate Pesticide, Liquid, NOS	Flammable Liquid	UN2758
PESTICIDES CONTAINING MERCURY*				
2-Methoxyethylmercuric chloride	MEMC, Agallol, Cekusil Universal-C, Ceresan-Universal-Nassbeize, Emisan 6	Waste Mercury Based Pesticide, Solid, NOS	Poison B	UN2777
		Waste Mercury Based Pesticide, Liquid, NOS	Poison B	UN2777
		Waste Mercury Based Pesticide, Liquid, NOS	Flammable Liquid	UN2778
Phenylmercuric acetate	PMA, PMAS, Agrosan, Cekusil, Celmer, Gallotox, Hong Nien, Liquiphene, Mersolite, Pamisan, Phix, Seedtox, Shimmer-ex, Tag HL 331	Waste Mercury Based Pesticide, Solid, NOS	Poison B	UN2777
		Waste Mercury Based Pesticide, Liquid, NOS	Poison B	UN2777
		Waste Mercury Based Pesticide, Liquid, NOS	Flammable Liquid	UN2778
PESTICIDES CONTAINING NICOTINE				
Nicotine	Black Leaf 40	Waste Poison B, Solid, NOS	Poison B	UN2811
		Waste Poison B, Liquid, NOS	Poison B	UN2810
		Waste Flammable Liquid, Poisonous, NOS	Flammable Liquid	UN1992
PESTICIDES CONTAINING SUBSTITUTED NITROPHENOLS				
Dinitrocresol	DNC, DNOC, Chemsect, Detal, Elgetol 30, Nitador, Selinin, Sinox, Trifocide, Trifrina	Waste Substituted Nitrophenol Pesticide, Solid, NOS	Poison B	UN2779
				UN2779
		Waste Substituted Nitrophenol Pesticide, Liquid, NOS	Poison B	UN2780
		Waste Substituted Nitrophenol Pesticide, Liquid, NOS	Flammable Liquid	
Dinoseb	DNBP, Basanite, Caldon, Chemox General, Chemox PE, Dinitro, Dinitro General, Dynamite, Elgetol 318, Gebutox, Hel-Fire, Nitropone C, Premerge 3, Sinox General, Subitex, Vertac General Weed Killer, Vertac Selective Weed Killer	Waste Substituted Nitrophenol Pesticide, Solid, NOS	Flammable Liquid	UN2780
		Waste Substituted Nitrophenol Pesticide, Liquid, NOS		
		Waste Substituted Nitrophenol Pesticide, Liquid, NOS		
ORGANOPHOSPHATE PESTICIDES				
Dimethoate	AC-12880, Bi 58 EC, Cekuthoate, Cygon, Daphene, De-Fend, Demos-L40, Devigon, Dimet, Dimethogen, Perfekthion, Rebelate, Rogodial, Rogor, Roxion, Trimetion	Waste Organophosphorus Pesticide, Solid, NOS	Poison B	UN2783
		Waste Organophosphorus Pesticide, Liquid, NOS	Poison B	UN2783
		Waste Organophosphorus Pesticide, Liquid, NOS	Flammable Liquid	UN2784
Disulfoton	BAY 19639 and S276, Dithiodemeton, Dithiosystox, Di-Syston, Ethylthiodemeton, Frumin AL, M-74, Solvirex, Thiodemeton	Waste Disulfoton	Poison B	NA2783
		Waste Disulfoton Mixture, Dry	Poison B	NA2783
		Waste Disulfoton Mixture, Liquid	Poison B	NA2783
		Waste Organophosphorus Pesticide, Liquid, NOS	Flammable Liquid	UN2784
Famphur	Bash, Bo-Ana, Dovip, Famfos, Warbex	Waste Organophosphorus Pesticide, Solid, NOS	Poison B	UN2783
		Waste Organophosphorus Pesticide, Liquid, NOS	Poison B	UN2783
		Waste Organophosphorus Pesticide, Liquid, NOS	Flammable Liquid	UN2784
Methyl Parathion	Cekumethion, E-601, Devithion, Folidol M, Fosferno M50, Gearphos, Metacide, Metaphos, Nitrox 80, Parataf, Paratox, Partron M, Penncap-M, Wofatox	Waste Methyl Parathion, Liquid	Poison B	NA 2783
		Waste Methyl Parathion Mixture, Dry	Poison B	NA2783
		Waste Methyl Parathion Mixture, Liquid (containing 25% or less methyl parathion)	Poison B	NA2783
		Waste Methyl Parathion Mixture, Liquid (containing more than 25% methyl parathion)	Poison B	NA2783
		Waste Organophosphorus Pesticide, Liquid, NOS	Flammable Liquid	UN2784
Parathion	AC-3422, Alkron, Alleron, Aphamite, Bladan, Corothion, E-605, ENT 15108, Ethyl Parathion, Etilon, Folidol E-605, Fosferno 50, Niran, Orthophos, Panthion, Paramar, Paraphos, Parathene, Parawet, Phoskil, Rhodiatox, Soprathion, Station, Thiophos	Waste Parathion, Liquid	Poison B	NA2783
		Waste Parathion Mixture, Dry	Poison B	NA2783
		Waste Parathion Mixture, Liquid	Poison B	NA2783
		Waste Organophosphorus Pesticide, Liquid, NOS	Flammable Liquid	UN2784

Table 3 (continued)

Pesticide and Agricultural Chemical Formulators Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
STRYCHNINE PESTICIDES				
Strychnine	Strychnine Salts	Waste Strychnine, Solid	Poison B	UN1692
		Waste Strychnine Salt, Solid	Poison B	UN1692
THALLIUM SULFATE PESTICIDES				
Thallium Sulfate	Thallous Sulfate, Ratox, Zelio	Waste Thallium Sulfate, Solid	Poison B	NA1707
		Waste Flammable Liquid, Poisonous, NOS	Flammable Liquid	UN1992
TRIAZINE PESTICIDES				
Amitrole	Amerol, Amino Triazol Weedkiller 90, Amizol, AT-90, AT Liquid, Azolan, Azole, Cytrol, Diurol, Farmco, Herbizole, Simazol, Weedazol, Weedazol TL	Waste Triazine Pesticide, Solid, NOS	Poison B	UN2763
		Waste Triazine Pesticide, Liquid, NOS	Poison B	UN2763
		Waste Triazine Pesticide, Liquid, NOS	Flammable Liquid	UN2764
PHENOXY PESTICIDES				
2,4-D*	Amoxone, Brush Killer, Brush Rhap, Chloroxone, Crop Rider, D50, DMA 4, Dacamine, Ded- Weed, Desormone, Dinoxol, Emulsamine BK and E3, Envert DT and 171, Hedonal, Miracle, Pennamine D, Rhodia, Salvo, Super D-Weedone, Verion, Visko-Rhap, Weed Tox, Wee-B-Gone, Weed-Rhap, Weedar, Weedone, Weedtrol	Waste 2,4-Dichlorophenoxyacetic Acid	ORM-A	NA2765
		Waste 2,4-Dichlorophenoxyacetic Ester	ORM-E	NA2765
		Waste Phenoxy Pesticide, Liquid, NOS	Flammable Liquid	UN2766
2,4,5-T	Brush-Rhap, Dacamine, Ded-Weedon, Esteron, Farmco Fence Rider, Forron, Inverton 245, Line Rider, Super D Weedone, Tormona, Transamine, U 46, Veon 245, Weedar, Weedone	Waste 2,4,5-Trichlorophenoxyacetic Acid	ORM-A	NA2765
		Waste 2,4,5-Trichlorophenoxyacetic Acid (amine, ester, or salt)	ORM-E	NA2765
		Waste Phenoxy Pesticide, Liquid, NOS	Flammable Liquid	UN2766
Silvex*	2,4,5-Fenoprop, AquaVex, Double Strength, Fruitone T, Kuron, Kurosal, Silvi-Rhap, Weed-B-Gone	Waste 2-(2,4,5-Trichlorophenoxy) propionic Acid	ORM-A	NA2765
		Waste 2-(2,4,5-Trichlorophenoxy) propionic Acid Ester	ORM-E	NA2765
		Waste Phenoxy Pesticide, Liquid, NOS	Flammable Liquid	UN2766
ORGANOCHLORINE PESTICIDES				
Aldrin	HHDN, Aldrex 30, Aldrite, Aldrosol, Altox, Drinox, Octalene, Seedrin Liquid	Waste Aldrin	Poison B	NA2761
		Waste Aldrin Mixture, Dry (with more than 65% Aldrin)	Poison B	NA2761
		Waste Aldrin Mixture, Dry (with 65% or less Aldrin)	ORM-A	NA2761
		Waste Aldrin Mixture, Liquid (with more than 60% Aldrin)	Poison B	NA2762
		Waste Aldrin Mixture, Liquid (with 60% or less Aldrin)	ORM-A	NA2762
		Waste Organochlorine Pesticide, Liquid, NOS	Flammable Liquid	UN2762
Chlordane*	Belt, Chlordan, ChlorKil, Chlortox, Corodane, Gold Crest C-100, Kypchlor, Vesicol 1068, Topiclor 20, Niran, Octachlor, Octa-Klor, Ortho-Klor, Synklor, Termi-Ded	Waste Chlordane, Liquid	Flammable Liquid	NA2762
		Waste Chlordane, Liquid	Combustible Liquid[4]	NA2762
DDT	Dedelo, Didimic, Digmar, Genitox, Gyron, Hildit, Kopsol, Neocid, Pentachlorin, Rukseam, Zerdane	Waste DDT	ORM-A	NA2761
		Waste Organochlorine Pesticide, Liquid, NOS	Flammable Liquid	UN2762
Dichloropropene	1,3-Dichloropropene, Telone II Soil Fumigant	Waste Dichloropropene	Flammable Liquid	UN2047
Dieldrin	Dieldrex, Dieldrite, Octalox, Panoram D-31	Waste Dieldrin	ORM-A	NA2761
		Waste Organochloride Pesticide, Liquid, NOS	Flammable Liquid	UN2762
Endrin*	Endrex, Hexadrin	Waste Endrin	Poison B	NA2761
		Waste Endrin Mixture, Liquid	Poison B	NA2761
		Waste Organochlorine Pesticide, Liquid, NOS	Flammable Liquid	UN2762
Endosulfan	Beosit, Chlorthiepin, Crisulfan, Cyclodan, Endocel, EnSure, FMC 5462, Hildan, Hoe 2671, Malix, Thifor, Thimul, Thiodan, Thiofor, Thionex, Thiovel	Waste Endosulfan	Poison B	NA2761
		Waste Endosulfan Mixture, Liquid	Poison B	NA2761
		Waste Organochlorine Pesticide, Liquid, NOS	Flammable Liquid	UN2762

Table 3 (continued)

Pesticide and Agricultural Chemical Formulators Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
Heptachlor*	Gold Crest H-60, Drinox H-34, Heptamul, Heptox	Waste Heptachlor Waste Organochlorine Pesticide, Liquid, NOS	ORM-E Flammable Liquid	NA2761 UN2762
Kepone	Chlordecone, GC 1189	Waste Kepone Waste Organochlorine Pesticide, Liquid, NOS	ORM-E Flammable Liquid	NA2761 UN2762
Lindane*	Exgama, Forlin, Gallogama, Gamaphex, Gammex, Inexit, Isotox, Lindafor, Lindagam, Lindagrain, Lindagranox, Lindalo, Lindamul, Lindapourdre, Lindaterra, Novigam, Silvanol	Waste Lindane Waste Organochlorine Pesticide, Liquid, NOS	ORM-A Flammable Liquid	NA2761 UN2762
Methoxychlor	Flo Pro MeSeed Protectant, Marlate	Waste Methoxychlor Waste Organochlorine Pesticide, Solid, NOS Waste Organochlorine Pesticide, Liquid, NOS Waste Organochlorine Pesticide, Liquid, NOS	ORM-E Poison B Poison B Flammable Liquid	NA2761 UN2701 UN2761 UN2762
Propylene Dichloride	1,2-Dichloropropane	Waste Propylene Dichloride	Flammable Liquid	UN1279
Toxaphene*	Attac 4-2, 4-4, 6, 6-3, 8, Camphochlor, Motox, Phenacide, Phenatox, Strobane T-90, Toxakil, Toxon 63	Waste Toxaphene Waste Organochlorine Pesticide, Liquid, NOS	ORM-A Flammable Liquid	NA2761 UN2762
OTHER PESTICIDES				
Thiram	TMTD, AAtack, Arasan, Aules, Evershield T Seed Protectant, Fermide 850, Fernasan, Flo Pro T Seed Protectant, Hexathir, Mercuram, Nomersan, Pomarsolforte, Polyram-Ultra, Spotrete-F, Tetrapom, Thimer, Thioknock, Thiotex, Thiramad, Thirasan, Thiuramin, Tirampa, Trametan, Tripomol, Thylate, Tuads, Vancide TM	Waste Thiram Waste Flammable Liquid, Poisonous, NOS	ORM-A Flammable Liquid	NA2771 UN1992
Warfarin	Co-Rax, Cov-R-Tox, Kypfarin, Liqua-Tox, RAX, Rodex, Rodex Blox, Tox-Hid	Hazardous Waste, Solid NOS Hazardous Waste, Liquid, NOS Waste Flammable Liquid, NOS Waste Combustible Liquid, NOS	ORM-E ORM-E Flammable Liquid Combustible Liquid	NA9189 NA9189 UN1993 NA1993
Pentachlorophenol*	PCP, Penta, Penchlorol, Pentacon, Penwar, Sinituho, Santophen	Waste Pentachlorophenol Waste Flammable Liquid Waste Combustible Liquid	ORM-E Flammable Liquid Combustible Liquid	NA2020 UN1993 NA1993
Pentachloronitrobenzene	PCNB, Avicol, Botrilex, Brassicol, Earthcide, Folosan, Kobu, Pentagen, Saniclor 30, Terraclor, Tilcarex, Tritisan	Hazardous Waste, Solid, NOS Hazardous Waste, Liquid, NOS Waste Flammable Liquid, NOS Waste Combustible Liquid, NOS	ORM-E ORM-E Flammable Liquid Combustible Liquid	NA9189 NA9189 UN1993 NA1993
Hexachlorobenzene*	Perchlorobenzene, Anticarie, Ceku C.B., HCB, No Bunt	Hazardous Waste, Solid, NOS Hazardous Waste, Liquid, NOS Waste Flammable Liquid, NOS Waste Combustible Liquid, NOS	ORM-E ORM-E Flammable Liquid Combustible Liquid	NA9189 NA9189 UN1993 NA1993
1,2-Dibromo 3-chloropropane	DBCP, Nemafume, Nemanox, Nemaset, Nematocide	Hazardous Waste, Solid, NOS Hazardous Waste, Liquid, NOS Waste Flammable Liquid, NOS Waste Combustible Liquid, NOS	ORM-E ORM-E Flammable Liquid Combustible Liquid	NA9189 NA9189 UN1993 NA1993
IGNITABLE AND/OR TOXIC SOLVENTS USED IN PESTICIDES				
Methyl Alcohol	Methanol	Waste Methyl Alcohol	Flammable Liquid	UN1230
Ethyl Alcohol	Ethanol, Alcohol	Waste Ethyl Alcohol	Flammable Liquid	UN1170
Isopropyl Alcohol	Isopropanol	Waste Isopropanol	Flammable Liquid	UN1219
Toluene	Methyl Benzene, Toluol	Waste Toluene, (toluol)	Flammable Liquid	UN1294
Xylene	Dimethylbenzene, Xylol	Waste Xylene (xylol)	Flammable Liquid	UN1307
Chloroform*	Chloroform	Waste Chloroform	ORM-A	UN1888
Carbon Tetrachloride*	Perchloromethane, Tetraform, Carbona Halon 104	Waste Carbon Tetrachloride	ORM-A	UN1846
Benzene*	Benzol	Waste Benzene (Benzol)	Flammable Liquid	UN1114

Table 3 (continued)

Pesticide and Agricultural Chemical Formulators Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
Tetrachloroethylene*	Perc, Perclene, Tetralex, Nema, Tetracap, Persec, Antisal 1, Perawin, Didakene	Waste Tetrachloroethylene	ORM-A	UN1897
Solvent Mixtures		Waste Combustible Liquid, NOS (flash point between 100°F and 200°F)	Combustible Liquid	NA1993
		Waste Flammable Liquid, NOS (flash point less than 100°F)	Flammable Liquid	UN1993
OTHER WASTES				
Ignitable Wastes, NOS		Waste Flammable Liquid, NOS	Flammable Liquid	UN1993
		Waste Flammable Solid, NOS	Flammable Solid	UN1325
		Waste Combustible Liquid, NOS	Combustible Liquid	NA1993
Hazardous Waste		Hazardous Waste, Liquid or Solid, NOS	ORM-E	UN9189

* Toxicity Characteristic constituent. Any waste that results in a TCLP extract containing a Toxicity Characteristic constituent equal to or above regulatory levels is hazardous.

1 These descriptions may change given variations in waste characteristics or conditions. Note that the DOT shipping name, hazard class, and UN/NA ID number do not directly correspond to RCRA hazardous waste categories.

2 NOS - Not otherwise specified.

3 A flammable liquid has a flash point below 100°F.

4 A combustible liquid has a flash point between 100°F and 200°F.

Table 4

Pharmaceutical Preparations Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
SPENT SOLVENTS, STILL BOTTOMS, AND OTHER IGNITABLE TOXIC WASTES CONTAINING:				
Acetone	Acetone	Waste Acetone	Flammable Liquid[2]	UN1090
Benzene*	Benzene	Waste Benzene (Benzol)	Flammable Liquid	UN1114
Chloroform*	Chloroform	Waste Chloroform	ORM-A	UN1888
Carbon Tetrachloride*	Perchloromethane, Tetraform, Carbona, Halon 104	Waste Carbon Tetrachloride	ORM-A	UN1846
Phenol*	Phenol	Waste Phenol	Poison B	UN1671
Toluene				
OTHER WASTES				
Ignitable Waste, NOS[3]	Ignitable Wastes, NOS	Waste Flammable Liquid, NOS	Flammable Liquid	UN1993
		Waste Combustible Liquid, NOS	Combustible Liquid[4]	NA1993
		Waste Flammable Solid, NOS	Flammable Solid	UN1325
Hazardous Waste		Hazardous Waste, NOS	ORM-E	UN9189

* Toxicity Characteristic constituent. Any waste that results in a TCLP extract containing a Toxicity Characteristic constituent equal to or above regulatory levels is hazardous.

1 These descriptions may change given variations in waste characteristics or conditions. Note that the DOT shipping name, hazard class, and UN/NA ID number do not directly correspond to RCRA hazardous waste categories.

2 A flammable liquid has a flash point below 100°F.

3 NOS - Not otherwise specified.

4 A combustible liquid has a flash point between 100°F and 200°F.

Table 5

B 224337

Other Chemical Product Formulators Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
STRONG ACID/ALKALINE WASTES				
Ammonium Hydroxide	Ammonium Hydroxide, NH_4OH, Spirit of Hartshorn, Aqua Ammonia	Waste Ammonium Hydroxide (containing not less than 12% but not more than 44% ammonia)	Corrosive Material	NA2672
		(containing less than 12% ammonia)	ORM-A	NA2672
Hydrobromic Acid	Hydrobromic Acid, HBr	Waste Hydrobromic Acid	Corrosive Material	UN1788
Hydrochloric Acid	Hydrochloric Acid, HCl, Muriatic Acid	Waste Hydrochloric Acid	Corrosive Material	NA1789

Table 5 (continued)

Other Chemical Product Formulators Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
Hydrofluoric Acid	Hydrofluoric Acid, HF, Fluorohydric Acid	Waste Hydrofluoric Acid	Corrosive Material	UN1790
Nitric Acid	Nitric Acid, HNO_3, Aquafortis	Waste Nitric Acid (over 40%)	Oxidizer	UN2031
		(40% or less)	Corrosive Material	NA1760
Phosphoric Acid	Phosphoric Acid, H_3PO_4, Orthophosphoric Acid	Waste Phosphoric Acid	Corrosive Material	UN1805
Potassium Hydroxide	Potassium Hydroxide, KOH, Potassium Hydrate, Caustic Potash, Potassa	Waste Potassium Hydroxide Solution Dry Solid, Flake, Bead, or Granular	Corrosive Material Corrosive Material	UN1814 UN1813
Sodium Hydroxide	Sodium Hydroxide NaOH, Caustic Soda, Soda Lye, Sodium Hydrate	Waste Sodium Hydroxide Solution Dry Solid, Flake, Bead, or Granular	Corrosive Material Corrosive Material	UN1824 UN1823
Sulfuric Acid	Sulfuric Acid, H_2SO_4, Oil of Vitriol	Waste Sulfuric Acid	Corrosive Material	UN1832
Chromic Acid	Chromic Acid	Waste Chromic Acid Solution	Corrosive Material	UN1755
SPENT SOLVENTS, STILL BOTTOMS, AND OTHER IGNITABLE OR TOXIC WASTES CONTAINING:				
Acetone	Acetone	Waste Acetone	Flammable Liquid[2]	UN1090
Benzene*	Benzene	Waste Benzene (Benzol)	Flammable Liquid	UN1114
Methylene Chloride*	Dichloromethane, Methane Dichloride, Methylene Bichloride, NCI-C50102, Solaesthin, Aerothene, Narkotil, Solmethine	Waste Dichloromethane or Methylene Chloride	ORM-A	UN1593
Toluene	Toluene, Methacide, Methylbenzene, Methylbenzol, Phenylmethane, Toluol, Antisal 1A	Waste Toluene (Toluol)	Flammable Liquid	UN1294
Trichloroethylene*	TCE, Perm-A-Clor, Landain, Lethurin, Nialk, Triklene, Algylen, Trielin, Chlorylene, Dow-Tri	Waste Trichloroethylene	ORM-A	UN1710
Xylene	Xylene, Xylol	Waste Xylene (Xylol)	Flammable Liquid	UN1307
OTHER REACTIVE WASTES				
Hypochlorites	Sodium Hypochlorite, NaOCl Hypochlorous Acid, Cloros, Dazzle, Antiformin	Waste Hypochlorite Solution (more than 7% chlorine) Waste Hypochlorite Solution (not more than 7% chlorine)	Corrosive Material ORM-B	UN1791 NA1791
Organic Peroxides	Organic Peroxide	Waste Organic Peroxide, Liquid or Solution, NOS[3]	Organic Peroxide Flammable Liquid	NA9183 NA1993
Perchlorates	Irenat, Periodin, Perchlorocap	Waste Sodium Perchlorate Waste Potassium Perchlorate Waste Perchlorate, NOS	Oxidizer Oxidizer Oxidizer	UN1502 UN1498 NA1481
Permanganates	Permanganic Acid, Potassium Salt, Chameleon Mineral	Waste Potassium Permanganate Waste Sodium Permanganate Waste Permanganate, NOS	Oxidizer	UN1490 UN1503 NA1482
Sulfides	Potassium Monosulfide, K_2S, Sodium Sulfuret, Na_2S	Waste Potassium Sulfide Waste Sodium Sulfide, Anhydrous	Flammable Solid Flammable Solid	UN1382 UN1385
OTHER IGNITABLE OR TOXIC WASTES				
Ignitable Wastes NOS	Ignitable Wastes	Waste Flammable Liquid, NOS Waste Combustible Liquid, NOS	Flammable Liquid Combustible Liquid[4]	UN1993 NA1993
Hazardous Wastes NOS	Hazardous Wastes	Waste Flammable Solid, NOS Hazardous Waste, Solid, NOS Hazardous Waste, Liquid, NOS	Flammable Solid ORM-E ORM-E	UN1325 NA9189 NA9189

* Toxicity Characteristic constituent. Any waste that results in a TCLP extract containing a Toxicity Characteristic constituent equal to or above regulatory levels is hazardous.

1 These descriptions may change given variations in waste characteristics or conditions. Note that the DOT shipping name, hazard class, and UN/NA ID number do not directly correspond to RCRA hazardous waste categories.

2 A flammable liquid has a flash point below 100°F.

3 NOS - Not otherwise specified.

4 A combustible liquid has a flash point between 100°F and

B 224338

For further information call the RCRA/Superfund Hotline 1-800-424-9346

Printing and Allied Industries

Industry Overview

Not all printing and allied industry operations produce hazardous waste. If, however, you use solvents, strong acid or alkaline solutions, or paint or ink containing toxic organic chemicals or heavy metals, the waste you generate might be hazardous. If so, you might be subject to Resource Conservation and Recovery Act (RCRA) requirements covering the generation, transportation, and management of hazardous waste.

Many printing industries generate hazardous waste. Your firm is included in *printing and allied industries* if it is involved in:

Preparation:

- Typesetting
- Lithography
- Letterpress
- Gravure
- Engraving (stationery)
- Photoengraving.

Printing:

- Heatset lithography
- Non-heatset lithography
- Thermography
- Business form printing
- Sheetfed lithography
- Letterpress printing (including flexography)
- Gravure printing
- Screen press printing.

Finishing Operations:

- Looseleaf binder manufacturing
- Trade binding operations
- Book binding operations
- In-house binding operations
- Magazine and catalog binding operations.

Hazardous Wastes from Printing and Allied Industries

Printing generates waste ink and ink sludges that might contain solvents or heavy metals. The composition of inks used in printing and allied industries varies greatly depending on whether an ink is to be used for lithography, letterpress, gravure, flexography, or screen printing. Oil-based or paste inks are generally composed of colorant or pigments (carbon black, inorganic, and organic), varnish (drying oils, alkyd, resin-phenolic, resin-ester), drier (cobalt, manganese, or zirconium fatty acid compounds), and sometimes an extender, solvents and modifiers (waxes, petroleum solvents, and magnesia). Fluid inks contain a vehicle made of resin and solvent or oil, and additives such as waxes, drier, and wetting agents. While not all waste inks and ink sludges are hazardous, those containing solvents or heavy metals generally are.

Photographic processes are used in all major printing operations for image conversion and plate making. Photographic wastes, including heavy metal solutions and spent solvents, make up a large portion of the hazardous waste generated in these industries. Photographic wastes such as processing solutions, developers, hardeners, plating chemicals, fountain solutions, and fixing baths, that are sent directly to publicly owned treatment works (POTWs) for disposal are exempt from RCRA requirements (as is any waste sent directly to a POTW). Silver-containing solutions that pass through electrolytic, chemical replacement, or ion exchange silver recovery units located on your premises are also exempt. If, however, you send your waste offsite for silver recycling or solvent recovery, the waste must be accompanied by a Uniform Hazardous Waste Manifest.

Table 1 lists typical processes/operations in the printing and allied industries that might produce hazardous waste. Table 2 provides the Department of Transportation (DOT) information needed for the Manifest for some wastes generated by printers. Table 1 and Table 2 are not comprehensive lists. If you do not find your waste here but suspect it is hazardous, contact your EPA Regional office or state hazardous waste management agency for additional information.

Waste Minimization

An effective waste minimization program can reduce the costs, liabilities, and regulatory burdens of hazardous waste management, while potentially enhancing efficiency, product quality, and community relations. Waste minimization techniques that can help you reduce the amount of hazardous waste that you generate include:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Raw material substitution
- Loss prevention and housekeeping
- Waste segregation and separation
- Recycling.

Training and supervision of employees implementing waste minimization techniques is an important part of your successful program. Call the RCRA/Superfund Hotline toll-free at 800-424-9346 (or TDD 800-553-7672 for the hearing-impaired) for waste minimization information and publications.

B 224339

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Table 2

Printing and Allied Industries Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
PHOTOGRAPHIC WASTES				
Heavy Metal Solutions	Photographic processing waste containing heavy metals	Hazardous Waste Solution containing Cadmium, Chromium, Lead, and/or Cyanide	ORM-E	NA9189
SPENT SOLVENTS AND OTHER WASTES CONTAINING:				
Trichloroethylene*	Trichloroethylene, Trichloroethene, Ethinyl trichloride, Tri-Clene, Trielene, Tri	Waste Trichloroethylene	ORM-A	UN1710
Carbon Tetrachloride*	Carbon Tetrachloride, Perchloromethane, Necatorina, Benzinoform, CCl_4	Waste Carbon Tetrachloride	ORM-A	UN1846
Ethanol	Ethanol, Ethyl alcohol	Waste Ethyl Alcohol	Flammable Liquid[2]	UN1170
Isopropanol	Isopropanol, Isopropyl alcohol	Waste Isopropanol	Flammable Liquid	UN1219
Ethyl Benzene	Ethyl Benzene	Waste Ethyl Benzene	Flammable Liquid	UN1175
1,1,1-Trichloroethane	Aerothene TT, Chlorten, Inhibisol, Trichloroethane, Chlorothen NU, NCI-C04626, Methylchloroform, Chlorothene VG, Chlorothane NU, Chlorotene	Waste 1,1,1-Trichloroethane	ORM-A	UN2831
Methylene Chloride	Dichloromethane, Methane dichloride, Methylene bichloride, NCI-CS0102, Methylene dichloride, Solaesthin, Aerothene MM, Narkotil, Solmethine	Waste Dichloromethane or Methylene Chloride	ORM-A	UN1593
Methyl Ethyl Ketone*	Methyl Ethyl Ketone, MEK, Methyl Acetone, Meeico, Butanone, Ethyl Methyl Ketone	Waste Methyl Ethyl Ketone	Flammable Liquid	UN1193
Chlorobenzene*	Chlorobenzene, Monochlorobenzene, Phenylchloride	Waste Chlorobenzene	Flammable Liquid	UN1134
Chloroform*	Chloroform	Waste Chloroform	ORM-A	UN1888
WASTE INK WITH SOLVENTS OR HEAVY METALS				
Waste Ink	Various ingredients: Carbon tetrachloride, Chloroform, Methylene chloride, 1,1,1-Trichloroethane, 1,2-Dichloroethane, Benzene, Toluene, Ethyl benzene, Tetrachloroethylene, Trichloroethylene, Chromium, Copper, Lead, Zinc, Cyanide, Aluminum, Cadmium, Nickel, Cobalt	Waste Ink	Combustible Liquid[3] Flammable Liquid	UN2867 UN1210
CORROSIVE WASTES				
Ammonium Hydroxide	Ammonium Hydroxide, Aqua Ammonia, Ammonia Water, Spirit of Hartshorn, NH_4OH	Waste Ammonium Hydroxide (containing not less than 12% but not more than 44% ammonia)	Corrosive Material	NA2672
		Waste Ammonium Hydroxide (containing less than 12% ammonia)	ORM-A	NA2672
Hydrochloric Acid	Hydrochloric Acid, Muriatic Acid	Waste Hydrochloric Acid Mixture	Corrosive Material	NA1789
		Waste Hydrochloric Acid Solution	Corrosive Material	UN1789
Nitric Acid	Nitric Acid, Aquafortis, HNO_3	Waste Nitric Acid (over 40%)	Oxidizer	UN2031
		Waste Nitric Acid (40% or less nitric acid)	Corrosive Material	NA1760
Phosphoric Acid	Phosphoric Acid, Orthophosphoric Acid, H_2SO_4	Waste Phosphoric Acid	Corrosive Material	UN1805
Sodium Hydroxide	Sodium Hydroxide, Caustic Soda, Soda Lye, Sodium hydrate, NaOH	Waste Sodium Hydroxide Solution Dry Solid, Flake, Bead, or Granular	Corrosive Material Corrosive Material	UN1824 UN1823

Table 2 (continued)
Printing and Allied Industries Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
Sulfuric Acid	Sulfuric Acid, Oil of Vitriol	Waste Sulfuric Acid	Corrosive Material	UN1832
Chromic Acid	Chromic Acid	Waste Chromic Acid Solution	Corrosive Material	UN1755
SPENT PLATING WASTES				
Spent Plating Wastes	Spent etch baths, spent plating solutions and sludges, stripping and cleaning baths	Hazardous Waste, Liquid or Solid, NOS[4]	ORM-E	NA9189
INK SLUDGE WITH CHROMIUM OR LEAD				
Ink Sludge with Chromium or Lead	Ink sludge containing heavy metals	Hazardous Waste, Liquid or Solid, NOS	ORM-E	NA9189
OTHER WASTES				
Ignitable Wastes, NOS	Ignitable Wastes, NOS	Waste Flammable Liquid, NOS Waste Combustible Liquid, NOS Waste Flammable Solid, NOS	Flammable Liquid Combustible Liquid Flammable Solid	UN1993 UN1993 UN1325
Hazardous Wastes, NOS		Hazardous Waste, NOS	ORM-E	UN9189

* Toxicity Characteristic constituent. Any waste that results in a TCLP extract containing a Toxicity Characteristic constituent equal to or above regulatory levels is hazardous.

1 These descriptions may change given variations in waste characteristics or conditions. Note that the DOT shipping name, hazard class, and UN/NA ID number do not directly correspond to RCRA hazardous waste categories.

2 A flammable liquid has a flash point below 100°F.

3 A combustible liquid has a flash point between 100°F and 200°F.

4 NOS - Not otherwise specified.

B 224342

Drycleaning and Laundry Plants

Industry Overview

While not all dry cleaning and laundry facilities produce hazardous waste, those facilities using hazardous solvents might be subject to Resource Conservation and Recovery Act (RCRA) requirements covering the generation, transportation, and management of hazardous waste.

The establishments covered under *drycleaning and laundry plants* include:

- Retail drycleaning stores
- Industrial and linen supply plants with drycleaning operations
- Leather and fur cleaning plants
- Self-service laundromats with drycleaning equipment
- Other establishments with drycleaning operations.

Hazardous Wastes from Drycleaning and Laundry Plants

Potential hazardous wastes generated by drycleaning and laundry plants are primarily solvents. These solvents include:

Perchloroethylene, otherwise known as perc, PCE, or tetrachloroethylene

Valclene, also known as fluorocarbon 113 or trichlorotrifluoroethane

Petroleum solvents, such as Stoddard, quick-dry, low-odor, and other solvents.

Perchloroethylene plants potentially produce three types of hazardous wastes:

Still residues from solvent distillation (the entire weight)

Spent filter cartridges (total weight of the cartridge and remaining solvent after draining)

Cooked powder residue (the total weight of drained powder residues from diatomaceous or other powder filter systems after heating to remove excess solvent).

Valclene plants potentially produce two types of hazardous wastes:

Still residues from solvent distillation (the entire weight)

Spent filter cartridges (total weight of the cartridge and remaining solvent after draining).

Petroleum solvent plants potentially produce only one type of hazardous waste:

Still residues from solvent distillation (the entire weight).

To determine whether your plant qualifies as a regulated generator and to complete the Uniform Hazardous Waste Manifest, you must determine the weight of the hazardous waste your plant generates. Table 1 lists common types and average quantities of hazardous waste produced per 1,000 pounds of clothes cleaned.

If you generate 100 kilograms (220 pounds or about half of a 55-gallon drum) or more of hazardous waste per month, you must fill out a Uniform Hazardous Waste Manifest when you ship hazardous waste off your property. The Manifest requires the proper Department of Transportation (DOT) description for each waste. DOT description information is provided in Table 2 to aid in preparing the Manifest. Table 1 and Table 2 are not comprehensive lists. If you suspect you generate other hazardous wastes, contact your state hazardous waste agency or Regional EPA office for more information.

Waste Minimization

An effective waste minimization program can reduce the costs, liabilities, and regulatory burdens of hazardous waste management, while potentially enhancing efficiency, product quality, and community relations. Waste minimization techniques that can help you reduce the amount of hazardous waste that you generate include:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Raw material substitution
- Loss prevention and housekeeping
- Waste segregation and separation
- Recycling.

Training and supervision of employees implementing waste minimization techniques is an important part of your successful program. Call the RCRA/Superfund Hotline toll-free at 800-424-9346 (or TDD 800-553-7672 for the hearing-impaired) for waste minimization information and publications.

Table 1
Typical Quantities of Hazardous Waste From Dry Cleaning (Pounds of waste per 1,000 pounds of clothes cleaned)

Waste Type	Cleaning Method		
	PERC	Valclene	Petroleum Solvents
	Average Quantity of Hazardous Waste (pounds)		
Still Residues	25	10	20
Spent Cartridge Filters			
Standard (carbon core)	20	15	
Adsorptive (split)	30	20	
Cooked Powder Residue	40	NA	NA
Drained Filter Muck	NA	NA	•

• Well-drained filter cartridges or drained filter muck are solids and are not likely to meet the criteria for classification as ignitable solids; therefore, they are usually not hazardous wastes. Be sure, however, that these wastes do not fail the Toxicity Characteristic Leaching Procedure; if they do, they are hazardous wastes.

Leather Products Manufacturing

Industry Overview

Not all facilities that manufacture leather goods produce hazardous waste. If you do produce hazardous waste, however, you might be subject to Resource Conservation and Recovery Act (RCRA) requirements covering the generation, transportation, and management of hazardous waste.

Your business is included in the *leather products manufacturing* industry category if you:

- Tan or finish leather

or if you manufacture:

- Boot and shoe cut stock and findings
- Non-rubber footwear
- Leather gloves and mittens
- Luggage
- Handbags and other leather goods.

Hazardous Wastes from Leather Products Manufacturing

Manufacturers of leather products are likely to produce spent solvent wastes and wastes from the use of lacquers, materials containing lead, dyes, or materials that produce hydrogen sulfide. Table 1 lists general processes/operations that use hazardous materials and that might result in the generation of hazardous waste. If you generate 100 kilograms (220 pounds or about half of a 55-gallon drum) or more of hazardous waste per month, you must fill out a Uniform Hazardous Waste Manifest when you ship the hazardous waste off your property. The Manifest requires the proper Department of Transportation (DOT) description for each waste. Table 2 lists proper DOT shipping descriptions for a number of wastes that might be generated by the leather products manufacturing industry. Table 1 and Table 2 are not comprehensive lists. If a particular chemical you use is not included in these tables and you suspect it is hazardous, contact your state hazardous waste management agency or EPA Regional office for assistance.

Waste Minimization

An effective waste minimization program can reduce the costs liabilities, and regulatory burdens of hazardous waste management, while potentially enhancing efficiency, product quality, and community relations. Waste minimization techniques that can help you reduce the amount of hazardous waste that you generate include:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Raw material substitution
- Loss prevention and housekeeping
- Waste segregation and separation
- Recycling.

Training and supervision of employees implementing waste minimization techniques is an important part of your successful program. Call the RCRA/Superfund Hotline toll-free at 800-424-9346 (or TDD 800-553-7672 for the hearing-impaired) for waste minimization information and publications.

Table 1
Typical Leather Manufacturing Operations: Materials Used and Hazardous Wastes that Might be Generated

Process/ Operation	Materials Used	General Types of Waste Generated
Beamhouse/ Tanhouse	Lime, acids, chromium, salts	Acid/Alkaline wastes Toxic heavy metal wastes (dust and sludge) Other toxic wastes
Finishing/ Trimming	Chromium, solvents, dyes, lacquers	Toxic heavy metal wastes (dust and sludge) Other toxic wastes Spent solvent wastes

B 224345

EPA/530-SW-90-027r

Textile Manufacturing

Industry Overview

Not all textile manufacturing industries produce hazardous waste. If, however, you use hazardous solvents and materials containing toxic chemicals, you might be subject to Resource Conservation and Recovery Act (RCRA) requirements covering the generation, transportation, and management of hazardous waste.

The following *textile manufacturing industry* segments are covered by this summary:

- Broad woven fabric mills and wool mills, including dyeing and finishing
- Knitting mills and knit goods finishing
- Other dyeing and finishing textile mills
- Floor covering mills, including dyeing and finishing.

Hazardous Wastes from Textile Manufacturing

Most of the hazardous waste generated by textile manufacturers results from the use of solvents. Solvents are used in the dry-cleaning of synthetic fiber knit fabrics and woven and wool fabrics; in specialty operations such as tricot and lace splitting or solvent scouring; in dyeing operations; and in some finishing operations for impregnation or coating of textile fibers. In addition, solvents are used to clean machinery such as rollers and spinning machines used in textile manufacturing. Spent solvents are listed hazardous wastes. In addition, tetrachloroethylene, trichloroethylene, benzene, and ethylene dichloride are included in the recently expanded Toxicity Characteristic. Insecticides and disinfectants also sometimes contain Toxicity Characteristic chemicals such as cresols, chloroform, and carbon tetrachloride. Wastewaters or other process wastes containing these chemicals are hazardous if they fail the Toxicity Characteristic Leaching Procedure (TCLP) test.

Table 1 lists general processes/operations that use hazardous materials and that might result in the generation of hazardous waste. If you generate 100 kilograms (220 pounds or about half of a 55-gallon drum) or more of hazardous waste per month, you must fill out a Uniform Hazardous Waste Manifest when you ship the hazardous waste off your property. The Manifest requires the proper Department of Transportation (DOT) description for each waste. Table 2 lists proper DOT shipping descriptions for a number of wastes that are potentially generated during textile mill operations. Table 1 and Table 2 are not comprehensive lists. If you suspect that you generate a waste that is not included in this summary, contact your state hazardous waste management agency or EPA Regional office for assistance.

Waste Minimization

An effective waste minimization program can reduce the costs, liabilities, and regulatory burdens of hazardous waste management, while potentially enhancing efficiency, product quality, and community relations. Waste minimization techniques that can help you reduce the amount of hazardous waste that you generate include:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Raw material substitution
- Loss prevention and housekeeping
- Waste segregation and separation
- Recycling.

Training and supervision of employees implementing waste minimization techniques is an important part of your successful program. Call the RCRA/Superfund Hotline toll-free at 800-424-9346 (or TDD 800-553-7672 for the hearing-impaired) for waste minimization information and publications.

Table 1
Typical Textile Manufacturing Operations: Materials Used and Hazardous Wastes that Might be Generated

Process/ Operation	Materials Used	General Types of Waste Generated
Wool Scouring	Disinfectants, insecticides, solvents	Spent solvents Toxic wastes
Fabric and Floorcovering Finishing	Dyes, solvents, lacquers, bleaches, finishing agents, adhesives	Spent solvents Toxic wastes Wastewaters and wastewater treatment sludges with toxic constituents
Stock and Yarn Processing, Dyeing, and Finishing	Solvents, dyes	Spent solvents Toxic wastes

EPA 530-SW-90-077c

Laboratories

Industry Overview

Not all laboratories produce hazardous waste. If, however, you use ignitable compounds, strong acid or alkaline solutions, solvents, heavy metals, or toxic organic constituents, the waste you generate might be hazardous. If you generate hazardous waste, you might be subject to Resource Conservation Recovery Act (RCRA) requirements covering the generation, transportation, and management of hazardous waste.

Laboratories that use chemicals are likely to generate hazardous waste. These laboratories include:

- Research and development laboratories, such as government labs (e.g., National Institutes of Health, Food and Drug Administration) and industrial labs (e.g., chemicals, pharmaceuticals)
- Commercial testing laboratories, including labs that analyze hazardous waste samples
- Academic laboratories, such as university and high school labs, and labs of educational or scientific organizations
- Medical laboratories, including hospital and dental labs.

Hazardous Wastes from Laboratories

A large variety of wastes are generated by laboratories. The following wastes are commonly generated:

Spent solvents used in cleaning, extraction, or other processes

Unused reagents that are no longer needed, do not meet specifications, are contaminated, have exceeded their storage life, or are otherwise unusable in the lab

Reaction products of known or unknown composition, which are often produced by research and academic labs. (To facilitate disposal, labs should try to identify or characterize reaction products to the extent possible and label them with this information.)

Testing samples that are not entirely consumed by the test procedure

Contaminated materials such as glassware, paper, and plastic products.

If you generate 100 kilograms (220 pounds or about half of a 55-gallon drum) or more of hazardous waste per month, you must fill out a Uniform Hazardous Waste Manifest when you ship hazardous waste off your property. The Manifest requires the proper Department of Transporation (DOT) description for each waste. Table 1 lists DOT shipping descriptions for some wastes generated by laboratories. Table 1 is not a comprehensive list. If you do not find your waste here but suspect it is hazardous, contact your EPA Regional office or state hazardous waste management agency for additional information.

Radioactive waste, which is generated by some laboratories, is generally regulated under the Atomic Energy Act and in many cases is excluded from RCRA regulation. Nuclear Regulatory Commission and DOT regulations might apply. Contact the Nuclear Regulatory Commission, the DOT Materials Transport Bureau, or your state transportation agency for more information concerning proper transport and disposal of radioactive waste.

Waste Minimization

An effective waste minimization program can reduce the costs, liabilities, and regulatory burdens of hazardous waste management, while potentially enhancing efficiency, product quality, and community relations. Waste minimization techniques that can help you reduce the amount of hazardous waste that you generate include:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Raw material substitution
- Loss prevention and housekeeping
- Waste segregation and separation
- Recycling.

Training and supervision of employees implementing waste minimization techniques is an important part of your successful program. Call the RCRA/Superfund Hotline toll-free at 800-424-9346 (or TDD 800-553-7672 for the hearing-impaired) for waste minimization information and publications.

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Table 1
Laboratories Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
SOLVENTS				
Acetone		Waste Acetone	Flammable Liquid[2]	UN1090
Benzene*		Waste Benzene	Flammable Liquid	UN1114
Chloroform*	Trichloromethane	Waste Chloroform	ORM-A	UN1888
1,4-Dioxane	Diethylene Ether 1,4-Diethylene Oxide Diethylene Oxide Dixyethylene Ether	Waste Dioxane	Flammable Liquid	UN1165
Ethanol	Ethyl Alcohol Grain Alcohol	Waste Ethyl Alcohol	Flammable Liquid	UN1170
Ethyl Ether	*Ether* Diethyl Ether Diethyl Oxide	Waste Ethyl Ether	Flammable Liquid	UN1155
Formalin Formaldehyde Solution (1) flash point greater than 141°F		Waste Formaldehyde Solution	ORM-A (or Combustible Liquid if shipped in containers larger than 110 gallons)	UN2209
(2) flash point less than or equal to 141°F		Waste Formaldehyde Solution	ORM-A (or Combustible Liquid if shipped in containers larger than 110 gallons)	UN1198
Hexane	n-Hexane	Waste Hexane	Flammable Liquid	UN1208
Isopropanol	Isopropyl Alcohol IPA Dimethyl Carbinol 2-Propanol	Waste Isopropanol	Flammable Liquid	UN1219
Methanol	Methyl Alcohol Wood Alcohol	Waste Methyl Alcohol	Flammable Liquid	UN1230
Methyl Ethyl Ketone*	MEK 2-Butanone	Waste Methyl Ethyl Ketone	Flammable Liquid	UN1193
Methylene Chloride	Dichloromethane	Waste Dichloromethane (or Waste Methylene Chloride)	ORM-A	UN1593
Pentane		Waste Pentane	Flammable Liquid	UN1265
Petroleum Ether		Waste Petroleum Ether	Flammable Liquid	UN1271
Tetrahydrofuran	THF	Waste Tetrahydrofuran	Flammable Liquid	UN2056
Toluene	Toluol Methyl Benzene	Waste Toluene	Flammable Liquid	UN1294
Xylene	Xylol Dimethyl Benzene	Waste Xylene	Flammable Liquid	UN1307

Table 1 (continued)
Laboratories Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	
Carbon Tetrachloride*	Carbon Tet Tetrachloromethane Perchloromethane	Waste Carbon Tetrachloride	ORM-A	
Ignitable Liquids		Waste Flammable Liquids, NOS[3] Waste Combustible Liquids, NOS	Flammable Liquid Combustible Liquid	UN1993 NA1993
ACIDS/BASES				
Acetic Acid		Waste Acetic Acid, Glacial Waste Acetic Acid, Solution	Corrosive Material Corrosive Material	UN2789 UN2790
Hydrochloric Acid		Waste Hydrochloric Acid	Corrosive Material	UN1789
Nitric Acid		Waste Nitric Acid, over 40% Waste Nitric Acid, 40% or less Waste Nitric Acid, Fuming	Oxidizer Corrosive Material Oxidizer	UN2031 NA1760 UN2032
Perchloric Acid		Waste Perchloric Acid, not over 50% acid Waste Perchloric Acid, exceeding 50% but not exceeding 72% acid Waste Perchloric Acid, exceeding 72% acid	Oxidizer Oxidizer Forbidden[4]	UN1802 UN1873
Sulfuric Acid		Waste Sulfuric Acid Waste Sulfuric Acid, Spent	Corrosive Material Corrosive Material	UN1830 UN1832
Oleum	Fuming Sulfuric Acid	Waste Oleum	Corrosive Material	NA1831
Ammonium Hydroxide	Ammonia Solution Aqueous Ammonia	Waste Ammonium Hydroxide, containing less than 12% ammonia Waste Ammonium Hydroxide, containing not less than 12% but not more than 44% ammonia	ORM-A Corrosive Material	NA2672 NA2672
Potassium Hydroxide	Caustic Potash	Waste Potassium Hydroxide, Solid Waste Potassium Hydroxide, Liquid	Corrosive Material Corrosive Material	UN1813 UN1814
Sodium Hydroxide	Caustic Soda Lye	Waste Sodium Hydroxide, Solid Waste Sodium Hydroxide, Liquid	Corrosive Material Corrosive Material	UN1823 UN1824
NON-SPECIFIC WASTES				
Corrosive Liquids		Waste Corrosive Liquids, NOS	Corrosive Material	UN1760
Corrosive Solids		Waste Corrosive Solid, NOS	Corrosive Material	UN1759
Oxidizer, Corrosive, Liquid		Waste Oxidizer, Corrosive, Liquid, NOS	Oxidizer	NA9193
Oxidizer, Corrosive, Solid		Waste Oxidizer, Corrosive, Solid, NOS	Oxidizer	NA9194
Oxidizer		Waste Oxidizer, NOS	Oxidizer	UN1479
Poisonous Liquid[5]		Waste Poison B, Liquid, NOS	Poison B	UN2810
Poisonous Solid		Waste Poison B, Solid, NOS	Poison B	UN2811
Corrosive, Poisonous Liquid		Waste Corrosive Liquid, Poisonous, NOS	Corrosive Material	UN2922

UN/NA ID Number

Table 1 (continued)
Laboratories Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
Poisonous, Corrosive Solid		Waste Poisonous Solid, Corrosive, NOS	Poison B	UN2928
Poisonous, Oxidizing Liquid		Waste Oxidizer, Poisonous, Liquid, NOS	Oxidizer	NA9199
Poisonous, Oxidizing Solid		Waste Oxidizer, Poisonous, Solid, NOS	Oxidizer	NA9200
Hazardous Waste Liquid[6]		Hazardous Waste, Liquid, NOS	ORM-E	NA9189
Hazardous Waste Solid		Hazardous Waste, Solid, NOS	ORM-E	NA9189

* Toxicity Characteristic constituent. Any waste that results in a TCLP extract containing a Toxicity Characteristic constituent equal to or above regulatory levels is hazardous.

1 These descriptions may change given variations in waste characteristics, conditions or process modifications. Note that the DOT shipping name, hazard class, and UN/NA ID number do not directly correspond to RCRA categories of hazardous waste.

2 Substances with a flash point less than 100°F are classified as "Flammable Liquid"; substances with a flash point greater than or equal to 100°F and less than 200°F are classified as "Combustible Liquid."

3 NOS - Not Otherwise Specified.

4 Forbidden materials are prohibited from being offered or accepted for transportation.

5 Certain gases and volatile liquids (e.g., cyanogen, phosgene) are classed as Poison A. The gases and liquids have a different UN/NA ID; NA 1953 for poisonous liquid or gas, flammable, NOS; or NA 1955 or poisonous liquid or gas, NOS.

6 Materials (e.g., disposable labware) contaminated with small quantities of a variety of hazardous substances generally can be classified as Hazardous Waste, NOS, unless a more specific DOT shipping name applies. The entire weight of the contaminated materials, not just the weight of the substance(s) making it hazardous, is considered when determining quantity.

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Pulp & Paper Industry

Industry Overview

Not all pulp and paper mills or converting operations generate hazardous waste. If, however, your facility uses strong acids and bases, toxic organic chemicals, paints and adhesives, ink, or solvents, the waste associated with using these materials might be hazardous waste. If you generate hazardous waste, you might be subject to Resource Conservation and Recovery Act (RCRA) requirements covering the generation, transportation, and management of hazardous waste.

The *paper industry* is composed of several sectors, including:

- Pulp and paper mills, which produce mechanical, thermomechanical, and chemical pulps and process these pulps to form paper, paperboard, or building papers
- Converting operations, which manufacture boxes, tablets, and other finished paper products.

Hazardous Wastes from the Paper Industry

Pulp is made by mechanically or chemically separating the fibers in wood or other cellulose materials from nonfibrous material. In the kraft pulping process, used to make most chemical pulp, a solution of sodium hydroxide and sodium sulfide dissolves the nonfibrous materials. The pulp is then bleached if white paper is being produced. Several chemicals can be used for bleaching, including chlorine gas, sodium hydroxide, calcium hypochlorite, chlorine dioxide, hydrogen peroxide, and sodium peroxide. After any fillers and coloring materials are added, the pulp slurry is made into paper. Certain coatings can also be applied to the paper.

The large-volume wastes produced by the paper industry are not often classified as hazardous under RCRA. Some wastewaters and wastewater treatment sludges might fail the Toxicity Characteristic Leaching Procedure (TCLP) test due to the presence of organic constituents such as chloroform or trichloroethylene. Several lower volume hazardous wastes are generated, including:

Spent halogenated solvents used in degreasing

Corrosive waste generated from the use of strong acids and bases

Paint waste containing solvents and paint waste with heavy metals

Ink waste, which can include solvents, metals, or ignitable materials

Petroleum distillates from cleanup operations.

Spills of hazardous substances might also generate RCRA-regulated hazardous waste. Certain paper manufacturing facilities have associated research laboratories, which might produce a variety of hazardous wastes. Table 1 lists some typical processes/operations that might produce hazardous waste. Table 2 lists Department of Transportation (DOT) shipping descriptions (required on the Uniform Hazardous Waste Manifest) for a number of wastes that might be generated by the paper industry. Table 1 and Table 2 are not comprehensive lists. If you do not find your waste here but suspect it is hazardous, contact your EPA Regional office or state hazardous waste management agency for additional information.

Waste Minimization

An effective waste minimization program can reduce the costs, liabilities, and regulatory burdens of hazardous waste management, while potentially enhancing efficiency, product quality, and community relations. Waste minimization techniques that can help you reduce the amount of hazardous waste that you generate include:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Raw material substitution
- Loss prevention and housekeeping
- Waste segregation and separation
- Recycling.

Training and supervision of employees implementing waste minimization techniques is an important part of your successful program. Call the RCRA/Superfund Hotline toll-free at 800-424-9346 (or TDD 800-553-7672 for the hearing-impaired) for waste minimization information and publications.

EPA/530-SW-90-027o

Table 1

Typical Paper Industry Operations: Materials Used and Hazardous Wastes that Might be Generated

Process/ Operation	Materials Used	General Types of Waste Generated
Chemical Pulping	Acids/alkalies, lime, sulfurous acid, sodium hydroxide, sodium sulfide	Acid/alkaline waste
Bleaching	Chlorine bleaches, sulfate bleaches, chloroform, solvents	Toxic wastewater and wastewater treatment sludge Acid/alkaline waste
Papermaking	Pigments	Wastewater treatment sludge
Sizing and Starching	Waxes, glues, synthetic resins, hydrocarbons	Toxic waste, including wastewaters and sludges
Coating, Coloring, and Dyeing	Inks, paints, solvents, rubbers, dyes	Solvent waste Ink waste Paint waste Ignitable waste Toxic waste
Cleaning and Degreasing	Tetrachloroethylene, trichloroethylene, methylene chloride, trichloroethane, carbon tetrachloride	Solvent waste Toxic rinse water

Table 2

Paper Industry Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
SPENT SOLVENTS AND OTHER TOXIC OR IGNITABLE WASTES CONTAINING:				
Carbon Tetrachloride*	Carbon Tetrachloride, Carbon Tet, Tetrachloromethane	Waste Carbon Tetrachloride	ORM-A	UN1846
Methylene Chloride	Methylene Chloride, Dichloromethane	Waste Dichloromethane	ORM-A	UN1593
Tetrachloroethylene*	Tetrachloroethylene, Perchloroethylene, PCE	Waste Tetrachloroethylene	ORM-A	UN1897
1,1,1-Trichloroethane	1,1,1-Trichloroethane, 1,1,1-TCA	Waste 1,1,1-Trichloroethane	ORM-A	UN2831
Trichloroethylene*	Trichloroethylene, TCE	Waste Trichloroethylene	ORM-A	UN1710
Chloroform*	Chloroform	Waste Chloroform	ORM-A	UN1888
Benzene*	Benzene	Waste Benzene (Benzol)	Flammable Liquid[2]	UN1114
Ethylene Dichloride*	Ethylene Dichloride, 1,2-Dichloroethane	Waste Ethylene Dichloride	Flammable Liquid	UN1184
Chlorobenzene*	Chlorobenzene, Monochlorobenzene, Phenyl Chloride	Waste Chlorobenzene	Flammable Liquid	UN1134
Methyl Ethyl Ketone*	Methyl Ethyl Ketone, Methyl Acetone, Meetco, Butanone, Ethyl Methyl Ketone, MEK, 2-Butanone	Waste Methyl Ethyl Ketone	Flammable Liquid	UN1193
Mixed Spent Halogenated Solvents		Hazardous Waste, Liquid, NOS[3]	ORM-E	NA9189
Petroleum Distillates	Petroleum Distillates	Waste Petroleum Distillate	Flammable Liquid Combustible Liquid[4]	UN1268 UN1268

Table 2 (continued)
Paper Industry Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
CORROSIVE WASTES				
Ammonium Hydroxide	Ammonium Hydroxide, Aqueous Ammonia, Ammonia Water, Spirit of Hartshorn	Waste Ammonium Hydroxide (containing not less than 12% but not more than 44% ammonia)	Corrosive Material	NA2672
		Waste Ammonium Hydroxide (containing less than 12% ammonia)	ORM-A	NA2672
Hydrobromic Acid	Hydrobromic Acid	Waste Hydrobromic Acid	Corrosive Material	UN1788
Hydrochloric Acid	Hydrochloric Acid, Muriatic Acid	Waste Hydrochloric Acid Mixture	Corrosive Material	NA1789
		Waste Hydrochloric Acid Solution	Corrosive Material	UN1789
Hydrofluoric Acid	Hydrofluoric Acid	Waste Hydrofluoric Acid	Corrosive Material	UN1790
Nitric Acid	Nitric Acid, Aquafortis	Waste Nitric Acid (over 40%)	Oxidizer	UN2031
		Waste Nitric Acid (40% or less nitric acid)	Corrosive Material	NA1760
Phosphoric Acid	Phosphoric Acid, Orthophosphoric Acid	Waste Phosphoric Acid	Corrosive Material	UN1805
Potassium Hydroxide	Potassium Hydroxide, Caustic Potash	Waste Potassium Hydroxide Solution	Corrosive Material	UN1814
		Dry Solid, Flake, Bead, or Granular	Corrosive Material	UN1813
Sodium Hydroxide	Sodium Hydroxide	Waste Sodium Hydroxide Solution	Corrosive Material	UN1824
		Dry Solid, Flake, Bead, or Granular	Corrosive Material	UN1823
Sulfuric Acid	Sulfuric Acid, Oil of Vitriol	Waste Sulfuric Acid	Corrosive Material	UN1832
OTHER WASTES AND GENERAL CLASSIFICATIONS				
Paint Waste with Heavy Metals	Paint Waste with Heavy Metals	Hazardous Waste, Liquid or Solid, NOS	ORM-E	NA9189
Corrosive Liquid	Corrosive Liquids	Waste Corrosive Liquid, NOS	Corrosive Material	UN1760
Corrosive Solid	Corrosive Solids	Waste Corrosive Solid, NOS	Corrosive Material	UN1759
Ignitable Wastes, NOS	Ignitable Wastes, NOS	Waste Flammable Liquid, NOS	Flammable Liquid	UN1993
		Waste Combustible Liquid, NOS	Combustible Liquid	UN1993
		Waste Flammable Solid, NOS	Flammable Solid	UN1325
Hazardous Wastes, NOS		Hazardous Waste, NOS	ORM-E	UN9189

* Toxicity Characteristic constituent. Any waste that results in a TCLP extract containing a Toxicity Characteristic constituent equal to or above regulatory levels is hazardous.

1 These descriptions may change given variations in waste characteristics or conditions. Note that the DOT name, hazard class, and UN/NA shipping ID number do not directly correspond to RCRA categories of hazardous waste.

2 A flammable liquid has a flash point below 100°F.

3 NOS -Not otherwise specified.

4 A combustible liquid has a flash point between 100°F and 200°F.

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For further information call the RCRA/Superfund Hotline 1-800-424-9346

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